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## CHAPTER 3

### **TEACHERS' EXPERIENCES IN EISENHOWER-ASSISTED PROFESSIONAL DEVELOPMENT ACTIVITIES**

The goal of professional development is to improve teaching. In the last chapter, we discussed the strengths and weaknesses of current teaching practice in mathematics and science, and we identified areas in which professional development appears to be needed. In particular, many teachers do not appear to give sufficient attention to advanced topics, and many attempt to cover too many topics in too little depth. In addition, although many teachers have begun to employ active, discussion-oriented teaching strategies, the use of these strategies is frequently superficial. We now begin to examine the features of professional development that are associated with changes in teaching.

Title II of the Elementary and Secondary Education Act, as amended by the Improving America's Schools Act of 1994, states as its purpose to increase the quality of professional development and provide professional development to teachers of at-risk students. The legislation states that its purpose is to provide teachers with access to "sustained and intensive high-quality professional development" (Section 2002(1)) that among other things "is of sufficient intensity and duration to have a positive and lasting impact on the teacher's performance in the classroom" (Section 2002(2)(E)). The legislation also seeks to provide professional development that "reflects recent research on teaching and learning" (2002(2)(B)) and "includes strong academic content and pedagogical components" (2002(2)(C)).

The Eisenhower Program also places an emphasis on providing professional development to teachers in Title I schools. The legislation provides that LEAs and SEAs describe in their applications how activities will address the needs of teachers in Title I schools (Section 2205(b)(2)(E) and Section 2208(d)(1)(B)) and includes them in the needs assessment process (Section 2208(b)(2)).

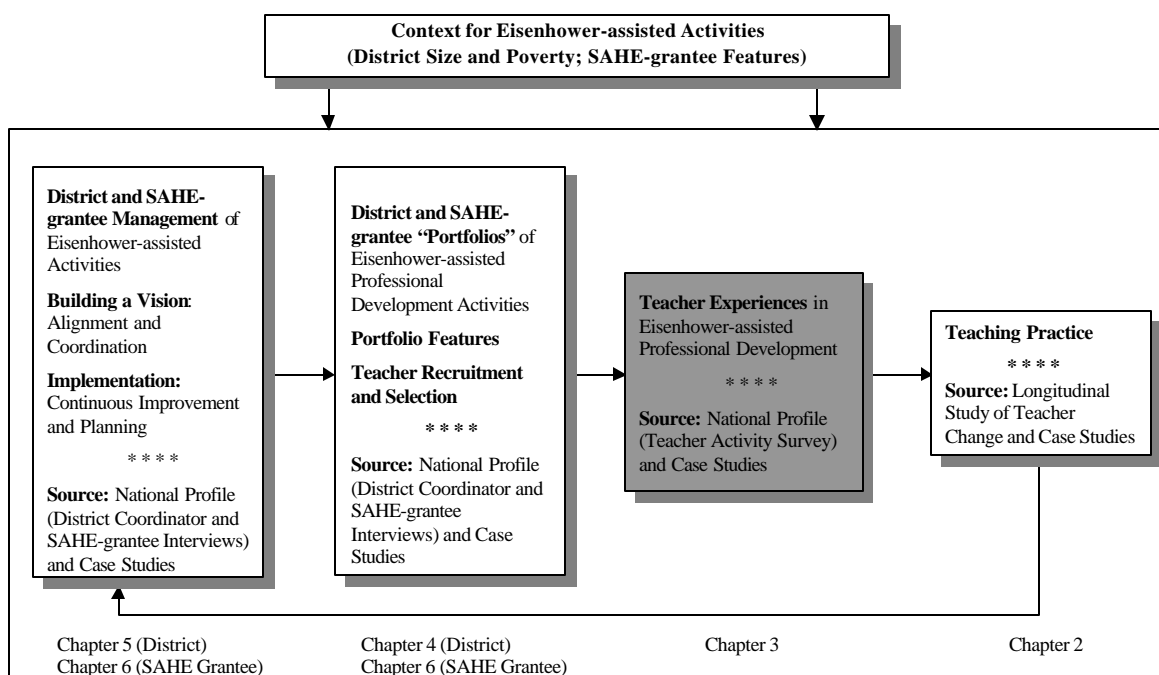
In this chapter, we examine the extent to which Eisenhower-assisted activities meet these provisions of the legislation. We also examine the extent to which supported activities reflect the characteristics of high-quality professional development that have emerged in the literature. Finally, we report on the extent to which Eisenhower-assisted activities meet the standards that have been set in the performance indicators for the program established by the Department of Education, in compliance with the Government Performance and Results Act (GPRA).

Exhibit 3.0 shows where these topics fit into the framework of the entire report.

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## EXHIBIT 3.0

### Conceptual Framework for This Evaluation



The purpose of this chapter is to identify features of professional development that might be appropriately incorporated in Eisenhower-assisted activities because they have been shown to be effective in improving teaching practice. To this end, we first describe the features of effective, high-quality professional development identified in the literature. Second, we present results from our study describing the extent to which Eisenhower-assisted activities reflect these features. Third, we use our data to assess the extent to which these features are related to teachers' reports of improvement in teaching practice. Our analyses have implications for federal legislation and regulations, which call for Eisenhower-assisted activities to have particular qualities and features. In effect, this study assesses the effectiveness and appropriateness of the current legislation's language and requirements, given our findings on the importance of particular characteristics of professional development. The framework that we use to model the features and impact of professional development is based on both the professional development literature and the analysis of our survey data.

### High-quality Professional Development

Over the past decade, a considerable literature has emerged on professional development, teacher learning, and teacher change.<sup>1</sup> The research literature contains a mix of large- and small-scale studies, including intensive case studies of classroom teaching, evaluations of programs designed to improve teaching and learning, and surveys of teachers about their pre-service

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<sup>1</sup> See V. Richardson & Placier, in press, for a comprehensive review of the literature on teacher learning and professional development.

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preparation and in-service professional development experiences.<sup>2</sup> In addition, there is a large literature describing “best practices” in professional development, drawing on expert experiences. Despite the size of the literature, however, relatively little systematic research has been conducted on the *effects* of professional development on improvements in teaching or on student outcomes.

Although relatively little research has been conducted on the effects of alternative forms of professional development, the research that has been conducted, along with the experience of expert practitioners, provides some preliminary guidance about the characteristics of high-quality professional development. (See, in particular, Loucks-Horsley et al., 1998.) Recently, for example, the U.S. Department of Education, drawing on the literature on teachers and teacher learning, identified six features of “best practice” in professional development. According to the Department (1999b, p. 63), effective professional development:

- ◆ **Reflects an image of teaching and learning that embraces high standards for all students.** Those who provide professional development must have a clear image of effective classroom learning and teaching. Good professional development is grounded in approaches to teaching that enable all students to achieve high standards, and makes these approaches real and accessible.
- ◆ **Focuses on deepening teachers’ knowledge of content and how students learn specific content.** Good professional development develops teachers’ skill and knowledge regarding the disciplines that they teach and children’s ways of learning at different ages and in different contexts. It is rigorous, relevant, and research-based.
- ◆ **Provides extended, in-depth learning opportunities for teachers.** Good professional development promotes learning through, among other things, modeling the methods to be used with students and showing how methods are adapted for different types of students. Like all good teaching, such experiences build on existing knowledge, immerse learners in stimulating processes, allow for teamwork, and spread out over time to permit learners to digest new ideas, try them out, and re-gather for critical feedback. Professional learning is embedded in the life of the school whenever appropriate.
- ◆ **Supports expanded roles for teachers as leaders and colleagues.** Good professional development provides opportunities for teachers to serve as mentors, peer coaches, leaders, designers, planners, and facilitators. Such roles encourage collegial relationships in a community of learners. These, in turn, could entail changes in allocations of authority, responsibility, and time in schools.
- ◆ **Links to an educational system’s programs and standards.** To strengthen the effectiveness of schools, professional development should be linked to other federal, state or district initiatives. It should be tied to relevant curricula, assessments, and standards.
- ◆ **Is accountable for results.** Professional development should be regularly evaluated for its impact on teaching and learning, and evaluation results should be used to support continuous improvement.

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<sup>2</sup> See, for example, Cohen (1990) for a recent intensive case study of change in mathematics teaching; Carey and Frechtling (1997) for a program evaluation of exemplary professional activities in science; and U.S. Department of Education (1999a) for a national survey of teachers focused on teacher preparation and qualifications.

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Similar characteristics appear in other recent examinations of mathematics and science teaching. For example, James Hiebert, in a review of the research on mathematics teaching and learning conducted for the National Council of Teachers of Mathematics, calls attention to the importance of high standards, content focus, and in-depth learning opportunities for teachers, although he uses somewhat different language. According to Hiebert,

Research on teacher learning shows that fruitful opportunities to learn new teaching methods share several core features: (a) ongoing (measured in years) collaboration of teachers for purposes of planning with (b) the explicit goal of improving students' achievement of clear learning goals, (c) anchored by attention to students' thinking, the curriculum, and pedagogy, with (d) access to alternative ideas and methods and opportunities to observe these in action and to reflect on the reasons for their effectiveness... (1999, p.15).

Although lists of characteristics such as these commonly appear in the literature on effective professional development, there is little direct evidence on the extent to which these characteristics are related to positive outcomes for teachers and students. Some studies conducted over the past decade suggest that professional development experiences that share all or most of these characteristics can have a substantial, positive influence on teachers' classroom practice and student achievement.<sup>3</sup> Several recent studies have begun to examine the relative importance of specific dimensions or characteristics of professional development. For example, a number of recent studies suggest that the intensity or duration of professional development is related to the depth of teacher change (Shields, Marsh, & Adelman, 1998; Weiss et al., 1998). Furthermore, there is some indication that professional development that focuses on specific mathematics and science content and the ways students learn such content is especially helpful, particularly for instruction designed to improve students' conceptual understanding (Cohen & Hill, 1998; Fennema et al., 1996). However, few studies have explicitly compared the effects of different forms of professional development on teaching and learning.<sup>4</sup>

Thus, there is a clear need for new, systematic research on the effectiveness of alternative strategies for professional development. The National Research Council, for example, in a review of recent research on the cognitive sciences, teaching, and learning, argues that

Research studies are needed to determine the efficacy of various types of professional development activities, including pre-service and in-service seminars, workshops, and summer institutes. Studies should include professional development activities that are extended over time and across broad teacher learning communities in order to identify the processes and mechanisms that contribute to the development of teachers' learning communities (Bransford et al., 1999, p. 240).

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<sup>3</sup> See, for example, Fennema et al. (1996), an experimental study examining the effects of Cognitively Guided Instruction, an intervention in elementary school mathematics; Wilson and Ball (1991), an intensive case study of two teachers who participated in the Summer Math program; and Cohen and Hill (1998), which describes the relationship between participation in professional development, teaching practice, and student achievement, using survey data from California. See Kennedy (1998) for a review of available randomized studies examining the effects of teacher professional development on student achievement in mathematics and science. See Shields, Marsh, and Adelman (1998) for a recent examination of the effects of the NSF SSIs on classroom practice in mathematics and science; and Weiss et al. (1998) for an examination of the effects of the NSF LSCs.

<sup>4</sup> Kennedy (1998) and Cohen and Hill (1998) are among the few examples of studies that compare the relative effectiveness of different forms of professional development. Both studies conclude that professional development focused on the teaching and learning of specific mathematics and science content is more effective than more general professional development.

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We designed the evaluation of Eisenhower-assisted professional development activities to enable us to examine the relationship between features of professional development that have been identified in the literature and change in teachers' knowledge and skills and classroom teaching practices, as reported by teachers. We integrated and operationalized the ideas in the literature on "best practices" in professional development to create a set of measures or scales describing the characteristics of Eisenhower-assisted activities.

In our analysis of the characteristics of high-quality professional development, we begin by focusing on what we term "structural features." These are characteristics of the structure or design of a professional development activity. We focus in particular on three structural features:

- ◆ The form or organization of the activity—that is, whether the activity is organized as a **reform type**, such as a study group, teacher network, mentoring, committee or task force, internship, individual research project, or teacher research center, in contrast to a traditional workshop or conference;
- ◆ the **duration** of the activity, including the total number of contact hours that participants are expected to spend in the activity, as well as the span of time over which the activity takes place; and
- ◆ the degree to which the activity emphasizes the **collective participation** of groups of teachers from the same school, department, or grade level, as opposed to the participation of individual teachers from many schools.

In addition to these structural features, we focus on three dimensions of the substance or core of the professional development experience. We examine three "core features":

- ◆ the degree to which the activity has a **content focus**—that is, the degree to which the activity is focused on improving and deepening teachers' content knowledge in mathematics and science;
- ◆ the extent to which the activity offers opportunities for **active learning**, such as opportunities for teachers to become actively engaged in the meaningful analysis of teaching and learning; for example, by reviewing student work or obtaining feedback on their teaching; and
- ◆ the degree to which the activity promotes **coherence** in teachers' professional development, by incorporating experiences that are consistent with teachers' goals, aligned with state standards and assessments, and encouraging of continuing professional communication among teachers.

Through our study of the literature and the analysis of our survey data, we have formulated a model characterizing the relationships between the quality of professional development, defined by the structural and core features, and their role in improving teacher outcomes. In this model, the three structural features—type, duration, and collective participation—are conditions that enable or facilitate desired core features of professional development. That is, they set the parameters or context within which teacher learning takes place. The three core features of the professional development activity—content focus, active learning, and coherence—are factors that characterize the processes that occur during a professional development experience. By focusing on specific mathematics and

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science content, by engaging teachers in active work, and by fostering a coherent set of learning experiences, we hypothesize that a professional development activity is likely to enhance the knowledge and skills and improve the classroom teaching practice of participating teachers. This, of course, serves the ultimate goal of improved student learning.

## Data Sources

For the analyses in this chapter, we use information from the Teacher Activity Survey conducted as part of the evaluation. In the spring, summer, and fall of 1998, we surveyed a nationally representative sample of teachers who had attended Eisenhower-assisted activities over the period from July 1 through December 31, 1997.<sup>5</sup> We carried out the survey by drawing a national probability sample of districts and SAHE grantees. SAHE grantees include institutions of higher education (IHEs) such as universities, four-year colleges, or two-year colleges, and not-for-profits (NPOs), which are organizations such as zoos, museums, and libraries. Districts were sampled in proportion to the number of teachers in the district, and SAHE grantees were sampled in proportion to the size of their Eisenhower grant, based on the logic that SAHE grantees with larger grants would serve larger numbers of teachers. For each district and SAHE grantees drawn into the sample, we collected a complete list of all professional development activities conducted with Eisenhower funds over the period from July through December, 1997. We then drew a sample of two activities in each district or SAHE grantee, with the probability of an activity being selected in proportion to the number of teachers attending the activity. We then randomly subsampled two teachers who attended each activity. We received responses from 1,027 teachers, representing activities supported by Eisenhower funds in 358 districts and SAHE grantees. This produced an overall teacher response rate of 72 percent.<sup>6</sup>

The survey asked each teacher to provide detailed information about the *specific Eisenhower-assisted professional development activity* that we drew in our sampling process and that led the teacher to be selected for our sample. Responses are self-reports of teacher experiences and behavior.<sup>7</sup>

In discussing the structural features, quality, and outcomes of Eisenhower-assisted professional development in the chapter, we also include information from our In-Depth Case Studies, where appropriate. The case study data we present include information from six exploratory case studies that we conducted in the spring of 1997; and case studies of ten districts, two from each of five states, that we conducted during the 1997-1998 school year. We chose sites to allow variation

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<sup>5</sup> The term "Eisenhower-assisted activities" reflects the fact that district Eisenhower funds can support professional development activities in a number of ways. Eisenhower funds may be used to support all costs associated with activities, provided that these activities are allowed in the legislation (See Section 2210). Alternatively, Eisenhower funds may pay for only some of the allowable costs associated with an activity. This is a common occurrence, since the legislation encourages cost sharing of Eisenhower-assisted professional development activities with those funded by other programs (Section 2209).

<sup>6</sup> See Appendix A for a more complete discussion of the sampling plan for Teacher Activity Survey. All parameter estimates reported in the chapter incorporate weights reflecting the sampling plan. Reported p-values and the standard errors on which they are based, however, do not reflect the clustering, stratification, and variance in weights incorporated in the design. Analyses that take these elements of the complex sample design into account have been carried out, and the results are nearly identical to those reported in the chapter.

<sup>7</sup> The study was designed to maximize our capacity to provide a national description of Eisenhower-assisted activities and to assess the relationship between characteristics of activities and teachers' self-reported change in knowledge and skills and teaching practices. The study was not designed to allow us to examine the relationship between professional development and student achievement.

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according to efforts in state-level reform, the district's approach to professional development, and demographic and geographic characteristics.<sup>8</sup>

## Organization of Chapter

In the sections that follow, we draw on our national sample of teachers, supplemented with data from the case studies, to examine the extent to which Eisenhower-assisted activities incorporate practices that reflect high-quality, in terms of the three structural features and the three core features of professional development.<sup>9</sup> Then, we use the data to examine the relative strength of the relationship between these quality features and teachers' reported improvement in knowledge and skills and teaching practices.<sup>10</sup>

In many of the exhibits in this chapter, we contrast teachers' experiences in district and SAHE-grantee activities. These two components of the program operate in somewhat different organizational contexts. In particular, as we discuss in more detail in chapters 4, 5, and 6, districts receive Eisenhower funds through an allocation formula, while SAHE grantees compete for funds. In addition, districts generally offer a range of Eisenhower-assisted activities serving a relatively large number of teachers, while SAHE grantees tend to offer a few activities focused on a small number of teachers. As we discuss further in later chapters, these differences in organizational context may help explain differences in teacher experiences in these two components of the program.

This chapter is organized in five sections. The first section examines the structural features of Eisenhower-assisted professional development activities, and the second examines the core features of teachers' professional development experiences in the activities in which they participated. The third section examines the extent to which teachers report that participation enhanced their knowledge and skills and improved their teaching practices, and the fourth examines the relationship between structural features, core features, and teachers' reported enhancement of knowledge, skills, and teaching practices. The fifth section examines the extent to which teachers in Eisenhower-assisted activities teach in high-poverty schools, and the final section summarizes our evidence from participating teachers and draws some initial conclusions about the Eisenhower program.

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<sup>8</sup> See Appendix B for a more complete discussion of the design of the In-Depth Case Studies.

<sup>9</sup> Results for some analyses reported in this chapter were reported earlier in U.S. Department of Education (1999b). The earlier results differ from results in this report because they were preliminary, unweighted, and did not include the full sample of teachers and districts. Results are considered to be statistically significant if the p-value is .05 or smaller.

<sup>10</sup> The survey results in this chapter are based on teachers' self-reports on change in knowledge, skills, and teaching practices. We are also collecting longitudinal data on a sample of teachers as part of the evaluation. These longitudinal data will provide stronger evidence of change in classroom teaching, and they will permit us to test the relationships that we discuss in this chapter. Analyses of the longitudinal data will appear in the third evaluation report, scheduled to be available in the spring of 2000.

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## STRUCTURAL FEATURES

### Section Findings

- ◆ *Most teachers who participate in Eisenhower-assisted activities report that the activities take the form of workshops or conferences, for both districts and SAHE grantees; but some teachers report participating in reform types of activities, such as study groups, mentoring, or networks.*
- ◆ *Activities supported under the SAHE component of the program are of substantial duration, often lasting more than 80 hours and spanning a period of several months or more. Activities supported under the district component tend to be of shorter duration, although the duration appears to have increased since the previous Eisenhower evaluation.*
- ◆ *Although some Eisenhower-assisted activities are designed for groups of teachers from the same school, department, or grade level, most are designed for individual teachers*

While the authorizing legislation for the Eisenhower program does not specify the structure of supported activities in detail, the language included in the legislation nevertheless has important implications for the structure. In particular, the legislation includes language on both duration and collective participation, two of the three structural features on which we focus. With respect to duration, the legislation includes an intent to support professional development that “is of sufficient intensity and duration to have a positive and lasting effect on the teacher’s performance in the classroom” (Section 2002(2)(E)). Although the legislation does not specify a required minimum duration, supported activities should be long enough to have “lasting effects.”

In addition, the legislation includes language pertaining to the third structural feature—the extent to which activities encourage the collective participation of groups of teachers from the same school, department, or grade level. The legislation stipulates that LEAs should use at least 80 percent of Eisenhower funds for professional development for staff of “individual schools” that “is determined by such teachers and staff” and “to the extent practicable, takes place at the individual school site” (Section 2210(a)(1)(A)(B)). The law also suggests that funds may be used for “professional development for teams of teachers” (Section 2210(b)(3)(A)). These provisions, taken together, appear to encourage activities that are designed for collective participation.

In the paragraphs that follow, we examine the three structural features of Eisenhower-assisted professional development activities in more detail, relying on our data from a nationally representative sample of teachers who participated in Eisenhower-assisted activities during the 1997-98 year. We begin by examining the type or organizational form; we then consider the duration, and then the extent to which supported activities encourage collective participation.

### Type of Activity

Undoubtedly the most common type or form of professional development, and the form most criticized in the literature, is the “workshop.” A workshop is a structured approach to professional development that occurs outside the teacher’s own classroom. It generally involves a leader or



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leaders with special expertise and participants who attend sessions at scheduled times—often after school, on the weekend, or during the summer (Loucks-Horsley et al., 1998, pp. 42-43). Institutes, courses, and conferences are other traditional forms of professional development that share many of the features of workshops, in that they tend to take place outside of the teacher’s school or classroom; they involve a leader or leaders with special expertise, and participants who attend at scheduled times.

While traditional forms of professional development, such as workshops, institutes, courses, and conferences, are quite common, they are widely criticized as being ineffective in providing teachers with sufficient time, activities, and content necessary for increasing teacher’s knowledge and fostering meaningful changes in their classroom practice (Loucks-Horsley et al., 1998). As a result, there is growing interest in other “reform” types of professional development, such as study groups or mentoring and coaching. These reform types differ from traditional professional development in several respects. In particular, reform activities often take place during the regular school day. In fact, some reform activities, such as mentoring and coaching, take place, at least in part, during the process of classroom instruction or during regularly scheduled teacher planning time. By locating opportunities for professional development as part of a teacher’s regular work day, reform types of professional development may be more likely than traditional forms to make connections with classroom teaching, and they may be easier to sustain over time.

In addition, reform types of activities may be more responsive to how teachers learn (Ball, 1996), and may have more of an influence on changing teaching practice (Darling-Hammond, 1995; 1996; Hargreaves & Fullan, 1992; Little, 1993; Richardson, 1994; Sparks & Loucks-Horsley, 1989; Stiles, Loucks-Horsley, & Hewson, 1996). Further, Darling-Hammond argues that these activities may be more responsive to teachers’ needs and goals:

Some schools have begun to create new models of induction and ongoing professional development for teachers and principals. They feature mentoring for beginners and veterans, peer observation and coaching, local study groups and networks for developing teaching within specific subject matter areas (like the National Writing Project or the Urban Mathematics Collaboratives), teacher academies that offer ongoing seminars and courses of study tied to practice, and school-university partnerships that sponsor collaborative research, interschool visitations, and a variety of formal and informal learning opportunities developed in response to teachers’ and principals’ felt needs (Darling-Hammond, 1997b, p. 325).

In our survey of teachers, we asked each teacher to describe the specified Eisenhower-assisted activity in which the teacher participated, and, as part of the description, we asked the teacher to specify the *type* of activity, using the following set of categories:<sup>11</sup>

- ◆ *Within-district workshops or institutes*, focused on a specific topic, provided by or within the district.
- ◆ *Courses for college credit*.
- ◆ *Out-of-district workshops and institutes*, focused on a specific topic, provided outside of the district.

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<sup>11</sup> The categories draw in part on Loucks-Horsley et al. (1998).

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- ◆ *Out-of-district conferences*, provided by professional organizations, regional centers, the state department of education, etc.
  - ◆ *Teacher study groups* that meet regularly, in face-to-face meetings, to further teacher knowledge in their disciplines or of pedagogical approaches.
  - ◆ *Teacher collaboratives or networks*, connecting teachers regionally, state-wide, nationally, or internationally (this does not include activities described in the first three bullets).
  - ◆ *Committees or task forces* focusing on curriculum, instruction, or student assessment.
  - ◆ *Receiving mentoring, coaching, lead teaching, or observation*, in a one-on-one situation, usually in the classroom.
  - ◆ *Immersion or internship activities*, in which a teacher spends a concentrated period of time working in a lab or industrial setting with professionals in his or her subject area.
  - ◆ *Teacher resource centers*, which provide professional development materials and are staffed by a lead or resource teacher.

The first four types of activities (within-district workshops, courses for college credit, out-of-district workshops, and out-of-district conferences) are traditional in form; the remaining types of activities (teacher study groups, teacher collaborative or networks, committees, mentoring, internships, and resource centers) are reform activities.<sup>12</sup>

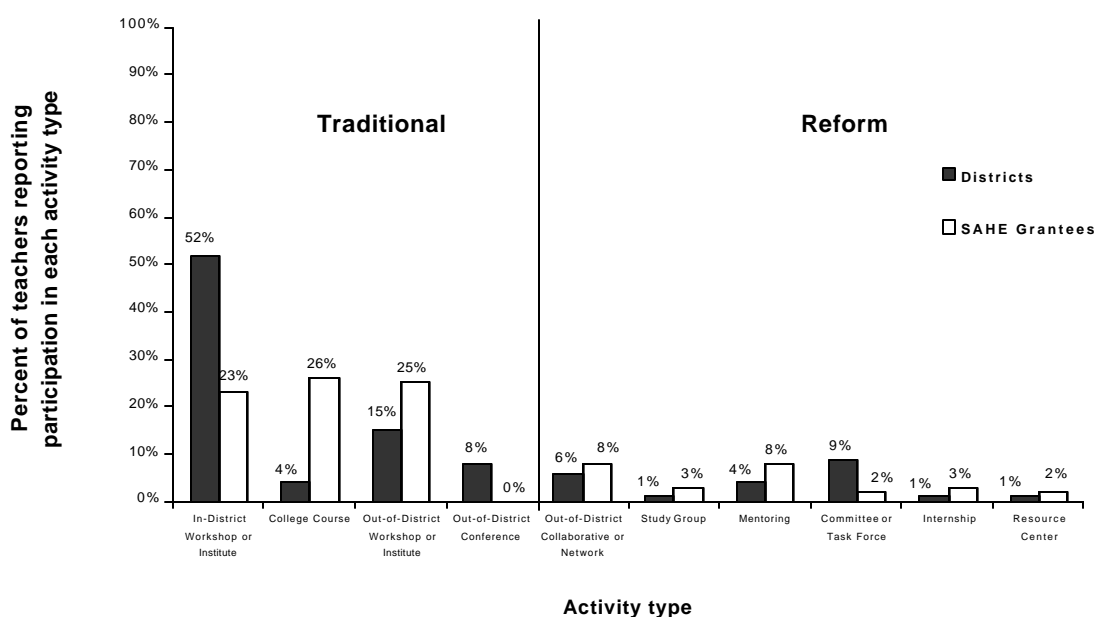
Exhibit 3.1, below, displays information from the teacher survey on the types of professional development activities supported by Eisenhower funds. The data indicate that most Eisenhower-assisted activities are traditional in form. Overall, 79 percent of teachers participating in district Eisenhower-assisted activities participated in traditional types of activities, including 52 percent in in-district workshops, 4 percent in college courses, 15 percent in out-of-district workshops or institutes, and 8 percent in conferences. Similarly, 74 percent of teachers participating in SAHE-grantee activities participated in traditional types. Some teachers report that the activities in which they participated were reform types, including collaboratives and networks, internships, mentoring, resource centers, committees and task forces, and study groups, but the overall percent of teachers participating in reform activities is relatively small.

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<sup>12</sup> The survey included a final category, “other organized forms of professional development,” and asked the teacher to describe the form. We reclassified all responses into one of the 10 forms listed.

## EXHIBIT 3.1

### Percent of Teachers Reporting Participation in Traditional and Reform Types of Eisenhower-assisted Professional Development Activities (District n=775, SAHE Grantee n=244)<sup>13</sup>



**Source:** Mail Survey of Teachers Participating in Eisenhower supported Professional Development Activities, 1998

**How to read this exhibit:** The first bar shows that 52 percent of the teachers who participated in district activities report that they attended an in-district workshop or institute. Each bar and the number on the top of it represent the percent of teachers for each category.

**Note:** “Districts” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. “SAHE grantees” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

About 22 percent of teachers participating in district activities and 26 percent of teachers participating in SAHE-grantee activities are in reform types of activities, including collaboratives and networks, mentoring, and study groups. The percent of teachers in such activities appears to have risen since the previous evaluation of the Eisenhower program, conducted in 1988-89 (Knapp et al., 1991). Nevertheless, workshops and other traditional forms continue to be the predominate types of professional development supported with Eisenhower funds.<sup>14</sup> In Chapters 4, 5, and 6, we explore some of the reasons for the continued reliance on traditional types of learning opportunities.

The type of an activity may set the context for many other features of the activity’s structure and substance. Because reform activities such as study groups and mentoring often take place during the regular school day, they may enable activities of longer duration than traditional activities; and

<sup>13</sup> Due to missing data caused by teacher nonresponse to particular survey questions, the number of teacher responses varies across survey items.

<sup>14</sup> The reported results concern the percent of teachers in reform activities. The percent of Eisenhower funds spent on reform activities may be higher, if reform activities cost more per teacher than traditional activities.

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they may make it easier to encourage the collective participation of groups of teachers from the same school or department. Given the potential importance of activity type as a key structural feature, we contrast traditional and reform activities in reporting our results throughout the chapter.

## Duration of Activity

Almost all of the recent literature on teacher learning and professional development calls for professional development that is sustained over time. The duration of professional development activities is expected to be important for two reasons. First, longer activities are more likely to provide an opportunity for in-depth discussion of mathematics and science content, student conceptions and misconceptions, and pedagogical strategies. Second, activities that extend over time are more likely to allow teachers to try out new practices in the classroom and obtain feedback on their teaching.

Project Science, an Eisenhower-assisted professional development activity in Middle City, Wisconsin, illustrates an activity that extends throughout a full year. The goal of Project Science is to involve teams of teachers from different schools in establishing the capacity to develop and administer performance assessments. The project included an institute in the summer, as well as two-hour monthly meetings over the school year, from September until May. In addition, during the year, school networking sessions focused on curriculum and learning issues and on the development of assessment instruments. During these meetings, teachers shared progress, difficulties, ideas, issues, and needs.

To develop a national estimate of the duration of professional development supported by the Eisenhower program, we included items on our Teacher Activity Survey asking about two aspects of duration: the total number of *contact hours* spent in the professional development activity, including all components of the activity that were held during the one-year period from July 1, 1997, through June 30, 1998; and the *span* or period of time, in days, weeks, and months, over which the activity was spread.<sup>15</sup> Exhibit 3.2 displays our results for contact hours. The results indicate that Eisenhower-assisted activities vary widely in the amount of time involved.

In the graph, each dot represents one teacher. If only one teacher in our sample attended an activity of a particular duration (e.g., 140 hours), the teacher appears as a single dot. If more than one teacher in our sample attended an activity of a particular duration (e.g., 20 hours), the teachers are displayed in a horizontal line. The length of the line is proportional to the number of teachers. For example, the graph indicates that more district teachers attended activities lasting 20 hours than lasting 30 hours.

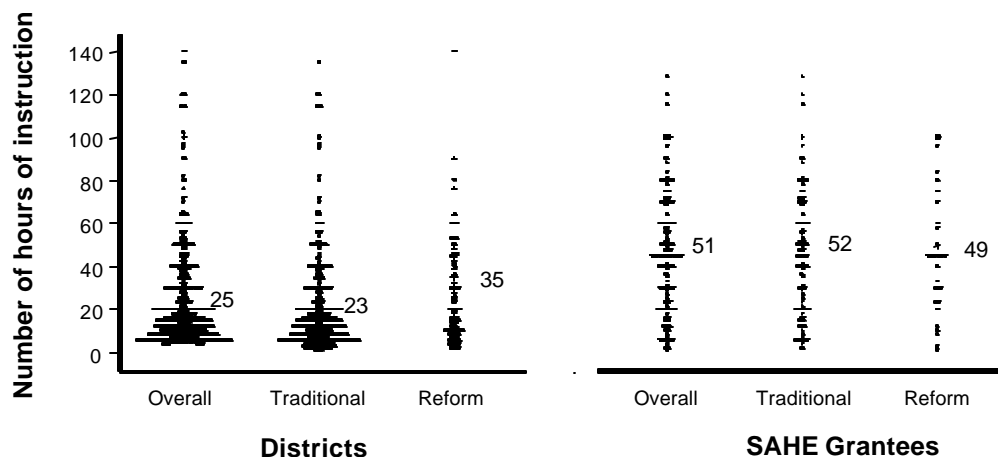
The number appearing on the right of each distribution is the average number of hours of instruction for that particular group of teachers. Overall, district activities last an average of 25 hours. SAHE-grantee activities last considerably longer than district activities. The average length of SAHE-grantee activities is 51 hours—nearly twice as long as district activities.

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<sup>15</sup> Teachers who completed their surveys before the end of the 1997-98 school year were asked to estimate the number of additional hours the activity would last during the remaining months of the school year.

## EXHIBIT 3.2

### Contact Hours Provided by Eisenhower-assisted Professional Development Activities, as Reported by Teachers (District n=767, SAHE Grantee n=244)



**Source:** Mail Survey of Teachers Participating in Eisenhower supported Professional Development Activities, 1998.

**How to read this exhibit:** The first column (District “Overall”) shows that on average, teachers who participated in district activities reported that they were engaged in the activity for 25 hours. Each dot represents one teacher. If more than one teacher reported the same number of hours, the teachers are displayed in a horizontal line with length proportional to the number of teachers. Each column represents the distribution for a particular group of teachers. The number to the right of each column is the mean.

**Note:** “Districts” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. “SAHE Grantees” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

While district activities tend to be shorter than SAHE-grantee activities, our results indicate that the median duration of district Eisenhower-assisted activities has approximately doubled since the last evaluation of the program was conducted in 1988-89. According to the 1988-89 evaluation, in the median district, activities supported by Eisenhower funds lasted an average of 6 hours, which is less than half of the current median of 15 hours.<sup>16</sup>

As expected, at least for districts, reform activities last longer than traditional types: the average length of reform activities is 35 hours, compared with 23 hours for traditional activities. For SAHE grantees, however, there is essentially no difference in length between traditional and reform types. In part, this may reflect the fact that many traditional SAHE-grantee activities are college courses, and college courses, at a minimum, generally last at least three hours a week for ten weeks. But courses do not fully account for the substantial length of traditional SAHE-grantee activities; workshops offered by grantees tend to be longer than those offered by districts.

One way to assess the adequacy of the number of contact hours of professional development provided by typical Eisenhower-assisted activities is to compare our results with the hours provided in widely known exemplary professional development activities in mathematics and science. One frequently cited professional development program is Cognitively Guided Instruction (CGI), which focuses on improving teachers’ understanding of student learning in elementary arithmetic

<sup>16</sup> The 1988-89 evaluation collected data on duration from districts rather than teachers, so a comparison of results from the 1988-89 and the current evaluation should be interpreted as providing an indication of the general magnitude of the change rather than a precise numerical estimate. See Knapp et al. (1991, p. 109).

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(Carpenter et al., 1989). The basis of the intervention is an 80-hour summer institute, with modest year-long follow-up. Fennema et al. (1996) have conducted a number of careful studies that show that the program has had a substantial positive influence on participating teachers' teaching practices and on student achievement as measured on tests of mathematical reasoning and problem solving. In a recent study of exemplary professional development activities in the sciences supported by NSF, ED, and other federal agencies, the activities involved lasted from a few days to eight weeks (Carey and Frechtling, 1997). Other studies include Cobb et al. (1991) and Wood and Sellers (1996), who show positive effects on student achievement in mathematical reasoning, based on a professional development activity lasting about 150 hours; and the Ohio State Systemic Initiative (Project Discovery), which produced positive changes in teaching practice, based on an intensive six-week (240 hours) summer program (Supovitz, 1996).

Many SAHE-grantee professional development activities have a duration (in hours) comparable to CGI, and this suggests that, at least potentially, these activities are sufficiently intensive to help teachers achieve worthwhile change in teaching practice. Typically, most district Eisenhower-assisted activities are substantially shorter than exemplary activities in mathematics and science.

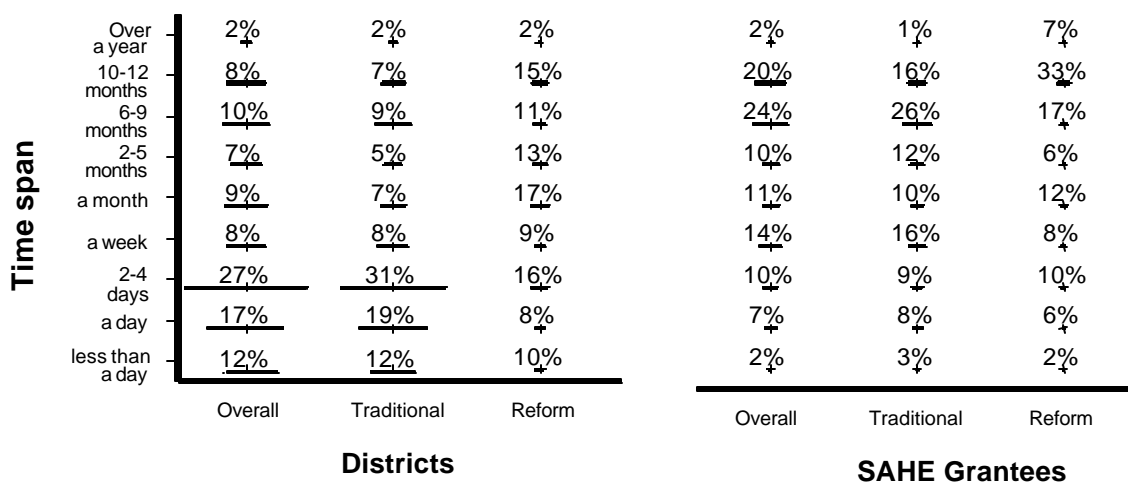
In addition to asking about the hours of professional development provided, we also asked about the span of the activity, or the period over which the sessions or components of the activity were spread. Although hours and span are correlated, they measure different aspects of duration, both of which are important in providing teachers with sufficient opportunities for in-depth study, interaction, and reflection.

The results, displayed in Exhibit 3.3, show that some Eisenhower-assisted activities take place over a one-day period, while others extend over a period longer than one month and some extend six months or more. The data indicate that, overall, about 27 percent of teachers in district Eisenhower-assisted activities report a span more than one month, while 56 percent of teachers in IHE activities report a span more than one month. As anticipated, there is a substantial difference in span between traditional and reform types. For districts, 23 percent of teachers in traditional activities report that these activities last more than a month, while 41 percent of reform activities exceed one month. Similarly, for IHE/NPOs, 55 percent of teachers in traditional activities report that they last longer than a month, while 73 percent of teachers in reform activities report that they exceed one month.

Many Eisenhower-assisted activities take place over a very short span of time. Overall, 56 percent of district activities span a period of less than one week (less than a day through four days) and 19 percent of SAHE-grantee activities span a period of less than one week.

### EXHIBIT 3.3

#### Time Span of Eisenhower-assisted Activities, as Reported by Teachers (District n=766, SAHE Grantee n=244)



**Source:** Mail Survey of Teachers Participating in Eisenhower supported Professional Development Activities, 1998.

**How to read this exhibit:** The first column shows that 2 percent of the teachers who participated in district activities were engaged in the activity over more than a year. Each dot represents one teacher. If more than one teacher reported the same span, the teachers are displayed in a horizontal line with length proportional to the number of teachers. Each column represents the distribution for a particular group of teachers. The number on the top of each line is the percent of teachers participating in the corresponding time span.

**Note:** "Districts" refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. "SAHE Grantees" refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

### Collective Participation

There is a growing interest in professional development that is designed for groups of teachers from the same school, department, or grade level. Although professional development designed for groups of teachers is sometimes thought to reinforce the status quo, it also has a number of potential advantages. First, teachers who work together are more likely to have the opportunity to discuss concepts, skills, and problems that arise during their professional development experiences. Second, teachers who are from the same school, department, or grade are likely to share common curriculum materials, course offerings, and assessment requirements. By engaging in joint professional development, they may be able to integrate what they learn with other aspects of their instructional context.

Finally, by focusing on a group of teachers from the same school, professional development may help sustain changes in practice over time, as some teachers leave the school's teaching force and other new teachers join the faculty. Professional development may help contribute to a shared professional culture, in which teachers in a school or teachers who teach the same grade or subject develop a common understanding of instructional goals, methods, problems, and solutions. (See, for example, Talbert & McLaughlin, 1993.) Collective participation in the same activity can provide a forum for debate and improving understanding, which increases teachers' capacity to grow (Ball, 1996).

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Knapp, in a 1997 review of the effects of systemic reform in mathematics and science, gives particular attention to the importance of viewing change in classroom teaching as a problem of *organizational* as well as *individual* learning:

Where and how does individual learning about challenging science instruction, for example, get deposited in organizational routines? How does a culture supportive of science instruction take root in a school and sustain itself beyond the original cast of characters who helped set in motion a shift in organizational culture? (p. 258)

Little research is available on the effects of collective approaches to professional development, but there is some evidence that it can be effective in changing teaching practice. Newmann and associates, in a study of 24 “restructuring schools,” note that, in the more successful schools:

Professional development tended to be focused on groups of teachers within the school or the faculty as a whole. Making use of internal as well as external expertise, staff development activities took advantage of local skills and sharing of effective practice. Including internal experts as staff developers reinforced teachers’ sense of commitment to their school’s goals (Newmann et al., 1996).

Maple City, Ohio, one of our case-study districts, illustrates an Eisenhower-assisted activity that encouraged collective participation similar in form to the learning opportunities Newmann et al. describe. The district offers several subject-specific, half- to full-day Eisenhower-assisted inservices by grade level. The inservices are led by the math and science coordinators or by someone outside the district. At the inservices, teachers share information and instructional practices, review instructional materials, and engage in activities to improve their skills. They are hands-on and support an integrated approach to instruction, including an emphasis on bridging instruction across contiguous grade levels. Teacher-Leaders help teachers implement new practices by serving as mentors in their classrooms. They plan with them, team-teach, and gather necessary supplies. In addition, the district provides teachers with time during the school day to get together and discuss what works and what does not.

To assess the prevalence of collective participation in Eisenhower-assisted activities, we asked each teacher in our national sample to indicate whether the activity in which the teacher participated was designed for all teachers in a school or set of schools, or all teachers in the teacher’s department or grade level.<sup>17</sup> The results, displayed in Exhibit 3.4, show that about 20 percent of teachers in district Eisenhower activities report that the activity was designed for all teachers in a department or grade level, and 19 percent report that the activity was for all teachers in a school. Fewer teachers in SAHE-grantee activities report either form of collective participation: seven percent indicate that their activity was designed for all teachers in a school, and 11 percent for all teachers in a department or grade level.

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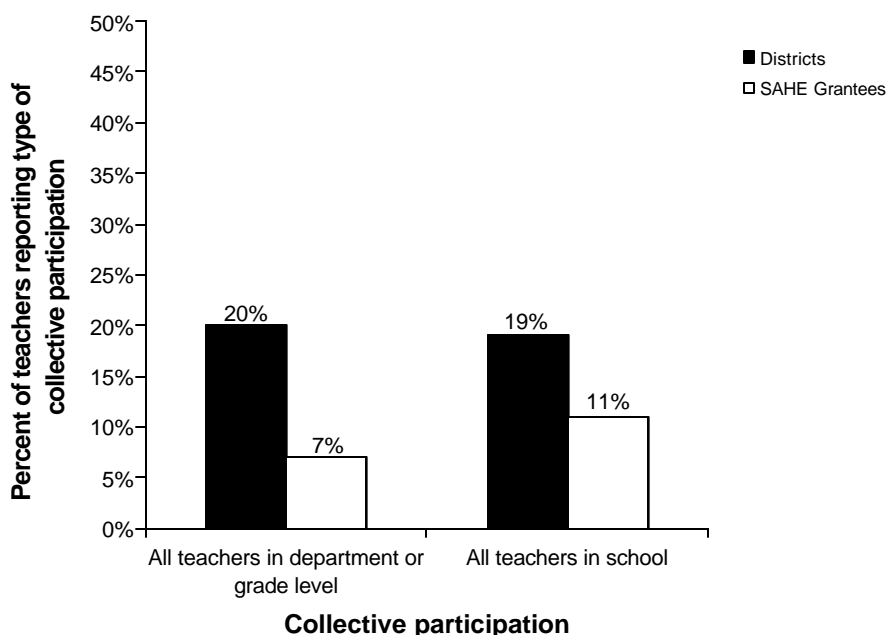
<sup>17</sup> Teachers were also given the following options: teachers as individuals, teachers as representatives of their departments, grade level, or schools, and other configurations. Teachers could check all that applied.



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## EXHIBIT 3.4

### Percent of Teachers Reporting School-level, and Department or Grade-level Participation in Eisenhower-assisted Professional Development Activities (District n=783, SAHE Grantee n=244)



**Source:** Mail Survey of Teachers Participating in Eisenhower supported Professional Development Activities, 1998.

**How to read this exhibit:** The first bar shows that 20 percent of the teachers who participated in district activities report that all teachers in department or grade-level groupings participated in the professional development activity. Each bar and the number on the top of it represent the percent of teachers for each category.

**Note:** “Districts” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. “SAHE Grantees” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

Because reform activities frequently occur during the school day, and often involve work in the classroom, we had anticipated that reform activities would be more likely to be designed to promote collective participation than traditional forms. Our data, however, show no difference between traditional and reform activities in collective participation, for either districts or IHE/NPOs. This result is consistent with data from some of our case sites. In several sites with mentors and coaches, for example, the mentors moved across schools to work with individual teachers. We also observed study groups whose membership crossed school and department boundaries.

By and large, most Eisenhower-assisted activities are designed for teachers as individuals. This pattern is consistent with other data on professional development, which shows that collective participation is relatively uncommon—indeed, less common overall than our data indicate is the case for Eisenhower-assisted activities. For example, according to Shields, Marsh, and Adelman (1998), very few State Systemic Initiatives (SSIs) have focused their professional development efforts on whole schools or departments, and those that did focused on just a few sites. As Shields, Marsh, and

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Adelman argue, one reason for this may be the resources required: providing sustained, intensive professional development for all teachers in a school may require more resources than are available. Programs thus face a tradeoff between providing longer-term professional development for some teachers, or focusing on whole schools.<sup>18</sup>

## Summary: Structural Characteristics

Overall, our data from a national sample of teachers who have attended Eisenhower-assisted activities show that most teachers participating in Eisenhower-assisted activities are in activities that are traditional in form, although about 20 percent of teachers in district activities and one-quarter of teachers in SAHE-grantee activities are in reform types, such as study groups and mentoring. In addition, our data indicate that Eisenhower-assisted activities supported through the SAHE component of the program are substantially longer in duration than activities supported under the district component of the program. Finally, most Eisenhower-assisted activities are focused on individual teachers, although about 20 percent of teachers in district activities report that activities are focused on whole schools or departments.

Our data can be used to provide evidence on one of the Department of Education's Performance Indicators established for the Eisenhower program. Indicator 3.2 focuses on the extent to which professional development supported by the program is *sustained* throughout the school year (see box). As shown in Exhibit 3.3, 20 percent of teachers participating in district activities are in activities that extend at least six months; and 46 percent of teachers participating in SAHE-grantee activities are in activities that extend beyond six months. If we use "at least six months" as the standard against which activities are to be assessed, then district activities do not yet meet the 35 percent standard set in the Indicator, while SAHE-grantee activities exceed the standard by a substantial amount.<sup>19</sup>

**Indicator 3.2 Sustained Professional Development.**

By 1998, 35 percent of teachers participating in district-level Eisenhower-assisted activities will participate in activities that are a component of professional development that extends over the school year; by 2000, over 50 percent will.

In summary, then, on average, SAHE-grantee activities appear to share more of the structural features associated with high-quality professional development than do district activities. District activities on the average are shorter, but the average duration has increased substantially since the last evaluation was conducted. In the following section, we turn to the core features of the experiences that take place during Eisenhower-assisted activities.

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<sup>18</sup> One exception to this general pattern may be found in the recently established NSF Local Systemic Change program, which incorporates a requirement that all elementary teachers in the target area participate in at least 100 hours of professional development, and all secondary teachers participate in at least 130 hours (Weiss et al., 1998).

<sup>19</sup> The Indicator requires that activities "are a component of professional development that extends over the school year." It is possible that some short-term Eisenhower activities are linked to other activities, and these "sequences" of activities extend over the school year. If so, the percent of Eisenhower-assisted activities extending more than six months may understate the percent of activities that "are a component of professional development that extends over the school year."

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## CORE FEATURES

### Section Findings

- ◆ *Many teachers participating in Eisenhower-assisted activities, especially SAHE-grantee activities, report that the activities place a major emphasis on deepening their content knowledge in mathematics and science.*
- ◆ *Most Eisenhower-assisted activities incorporate some form of active learning—for example, preparation of lesson plans and discussion of classroom implementation. Fewer activities involve other aspects of active learning—for example, observation of teaching and examination of student work.*
- ◆ *Eisenhower-assisted activities generally encourage a coherent process of teacher learning. Most teachers participating in Eisenhower-assisted activities report that the activities are consistent with their goals and aligned with state and district standards and assessments.*

In the previous section, we focused on three features of the structure of professional development activities that establish the setting in which professional development takes place: the type of activity, its duration, and opportunities for collective participation. In this section, we turn to the substance of the core experiences provided as the professional development activity unfolds.

The reauthorizing legislation for the Eisenhower program emphasizes the intent to support activities that are of “high quality,” but it does not spell out the particular characteristics that high-quality professional development should have. However, some elements of quality are enumerated in the rationale and supporting statements accompanying the legislation. For example, in referring to the literature on professional development, Section 2001(4)(A) states that:

professional development must be focused on teaching and learning in order to improve the opportunities of all students to achieve higher standards.

And Section 2001(4)(B), drawing on the literature, states that:

effective professional development focuses on discipline-based knowledge and effective subject-specific pedagogical skills, involves teams of teachers, and, where appropriate, administrators and pupil services personnel, in a school and, through professional networks of teachers, and, where appropriate, teacher educators, administrators, pupil services personnel, and parents, is interactive and collaborative, motivates by its intrinsic content and relationship to practice, builds on experience and learning-by-doing, and becomes incorporated into the everyday life of the school.

In addition, the explicitly stated purpose of the law is to ensure that teachers have access to professional development that “reflects recent research on teaching and learning” and “includes strong academic content and pedagogical components” (Section 2002(2)(B)(C)).

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In addition to the law, we have drawn on the literature to specify the dimensions of quality. In the discussion that follows, we examine three features in particular that the literature suggests may be related to improvements in teacher knowledge and skills, teaching practices, and student achievement. The first dimension concerns the extent to which Eisenhower-assisted activities focus on strong academic content; the second concerns the extent to which activities include opportunities for teachers to become actively engaged in learning new skills; and the third concerns the extent to which Eisenhower-assisted activities form part of a coherent, meaningful program of professional development that is consistent with teachers' goals and related to teachers' work.

While these three dimensions are not specifically identified in the legislation, they are broadly consistent with the purposes of the law. In particular, the Congressional findings and supporting statements for the law clearly encourage professional development that focuses on content ("discipline-based knowledge and effective subject-specific pedagogy"), that encourages active learning ("builds on experience and learning by doing"), and that encourages a coherent program of professional development ("becomes incorporated in the everyday life of the school") (Section 2001(4)(B)).

In the following sections, we consider each of these three core features in turn, drawing on our survey and case-study data to assess the extent to which Eisenhower-assisted activities reflect these central features of quality professional development.

## Focusing on Content

Although there is a large literature on professional development, surprisingly little attention has been given to the composition and characteristics of professional development activities. In particular, little research has been conducted on the relative efficacy of professional development activities that focus on different types of knowledge, skills, and teaching practices.<sup>20</sup>

The available descriptive research suggests that the content covered during professional development activities varies along at least four dimensions. First, activities vary in the relative emphasis they give to the *content* teachers are expected to teach and the *teaching methods* teachers are expected to employ. Some activities are intended primarily to improve teachers' knowledge of subject-matter content; some are designed to improve general pedagogy or teaching practices, such as classroom management, lesson planning, or grouping methods; and some are intended to improve what Shulman (1987) has termed "pedagogical content knowledge" – teaching practices in specific content domains, such as the teaching of multi-digit addition in elementary mathematics or forces and motion in physics.

Activities also vary in the *specificity of the changes* in teaching practice that are encouraged. Some activities focus on helping teachers use particular curriculum materials (e.g., new textbooks, science kits, or curriculum replacement units) or prescribed teaching strategies (e.g., specific student questioning strategies). Others focus on general principles, giving less attention to specific curricula or strategies. (See Kennedy, 1998, for a discussion of this distinction.)

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<sup>20</sup> Not all professional development is focused on knowledge and skills. Some activities are designed to increase teachers' awareness of new practices rather than to increase knowledge and skills; others are designed to build or renew teachers' motivation and commitment to teaching, without necessarily changing teaching practices.

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In addition, activities vary in the *goals for student learning* emphasized. Some activities emphasize helping teachers improve student performance in the basic skills—for example, memorizing facts and mastering procedural skills, such as long division or solving linear equations in one unknown. Other activities focus on helping teachers improve students’ conceptual understanding—for example, the ability to explain the reasons behind a solution strategy.<sup>21</sup>

Finally, activities vary in the emphasis they give to the *ways students learn* particular subject matter. Some activities give considerable emphasis to improving teachers’ understanding of how children learn, by focusing, for example, on common student preconceptions, misconceptions, and solution strategies in specific subject domains. Other activities focus primarily on new curricula or teaching methods, while giving little attention to the ways students learn.

Although there is little evidence on the relative effectiveness of professional development activities that focus on different types of knowledge, skills, and teaching practices, a small literature has begun to emerge focusing on these issues. In particular, an emerging body of work suggests that professional development that focuses on subject-matter content and how children learn it may be an especially important element in changing teaching practice (e.g., Ball & Cohen, in press; Corcoran, 1995). In part, researchers base this argument on the fact that many teachers lack strong content-specific teaching skills. Reynolds, for example, in a review of the knowledge base for elementary school teachers, concluded that “beginning teachers have surprisingly few content-specific pedagogical understandings” (1995, p. 214). And Rhine (1998), in a discussion of the role of research in teaching, pointed out that “[r]eform-minded teachers are hungry for continuing education that provides novel ways to address content” (p. 27).

A number of authors argue that professional development requires a dual focus on both knowledge of subject matter content and an understanding of how children learn specific content. Hiebert et al. (1996), for example, argue that teaching for understanding in mathematics requires two forms of knowledge:

knowledge of the subject to select tasks that encourage students to wrestle with key ideas and knowledge of students’ thinking to select tasks that link with students’ experience and for which students can see the relevance of the ideas and skills they already possess (p. 16).

This point of view is bolstered by several recent studies of the effects of professional development on student achievement. Cohen and Hill (1998) conducted a study of mathematics teaching in California, based on data on teachers’ professional development experiences and school-level data on student performance on a mathematics test administered statewide. They found that, controlling for the characteristics of students enrolled, average mathematics achievement was higher in schools in which teachers had participated in extensive professional development focusing on the teaching of specific mathematics content than in schools in which teachers had not. Participation in professional development focusing on general pedagogy, however, was not related to student achievement.

Kennedy (1998) found similar results in a review of well-designed experimental studies of the relationship between professional development and student achievement in mathematics and

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<sup>21</sup> See Chapter 2 for a discussion of these performance goals.

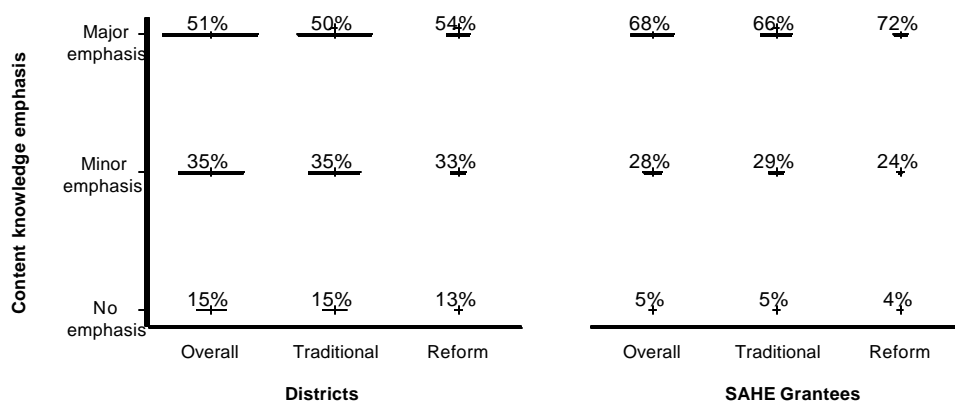
science, commissioned as part of this evaluation. The review found that, compared to more general professional development, professional development that focuses on specific content and how students learn has larger positive effects on student achievement outcomes, especially achievement in conceptual understanding.

Based on this emerging evidence, we view the *degree of content focus* as a central dimension of high-quality professional development. To examine the content focus of Eisenhower-assisted activities, we asked each teacher in our national sample to indicate the degree of emphasis the activity in which the teacher participated gave to deepening content knowledge in mathematics and science, using a three-point scale (no emphasis=zero, minor emphasis=one, major emphasis=two).<sup>22</sup>

The results are reported in Exhibit 3.5. As can be seen, many teachers in both district and SAHE-grantee activities report a major emphasis on content in the activities in which they participated, although teachers in district activities report somewhat less focus on content than teachers in SAHE-grantee activities. Overall, 51 percent of teachers in district activities report a major emphasis on content and 35 percent report a minor emphasis. For SAHE-grantee activities, 68 percent of teachers report a major emphasis and 28 percent report a minor emphasis. There is no significant difference in content focus between traditional and reform activities.

### EXHIBIT 3.5

#### Percent of Teachers Reporting a Major Emphasis on Mathematics and Science Content Knowledge in Eisenhower-assisted Professional Development Activities (District n=754, SAHE Grantee n=243)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first distribution shows that 51 percent of the teachers who participated in district activities report that a major emphasis was put on content knowledge in their activity. Each dot represents one teacher. As the number of teachers at one data point (or value) increases, the dots form a horizontal line that increases in length. Each distribution represents the distribution of teachers for that particular category. The number on the top of the distribution is the percent of teachers responding to the category.

**Note:** "Districts" refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. "SAHE Grantees" refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

<sup>22</sup> We did not ask teachers about other aspects of content-focus—for example, the extent to which the activity emphasized how students learn specific content or the extent to which it focused on methods of teaching specific content. Items on these aspects of content focus are included in the third wave of the teacher longitudinal survey, for which results will be available in the fall of 1999.

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Although our survey data do not tell us whether the content emphasized is of high quality, our data do indicate that a substantial proportion of Eisenhower-assisted activities are tied to subject-matter content. Given the growing literature and recent research emphasizing the potential relationship between content focus and student achievement, these results are encouraging.

## Promoting Active Learning

A second core feature of professional development concerns the opportunities provided for teachers to become actively engaged in meaningful discussion, planning, and practice as part of the professional development activity. (See, for example, Lieberman, 1996; and Loucks-Horsley, Hewson, Love, & Stiles, 1998.) Opportunities for active learning can take a number of forms, including the opportunity to observe expert teachers and to be observed teaching; the opportunity to plan how new curriculum materials and new teaching methods will be used in the classroom; the opportunity to review student work in the topic areas being covered; and the opportunity to lead discussions and engage in written work.

Lieberman (1996) argues that, for teachers to change their teaching, they must have the opportunity to “talk, think, try out, and hone new practices” (p. 189). Darling-Hammond (1997b) has characterized professional development with characteristics such as “rich professional development.” According to Darling-Hammond, rich professional development:

*is centered around the critical activities of teaching and learning—planning lessons, evaluating student work, developing curriculum—rather than around abstractions and generalities; it grows from investigations of practice through cases, questions, analysis, and criticism; and it is built on substantial professional discourse that fosters analysis and communication about practice and values in ways that build collegiality and standards of practice [emphasis in original] (p. 323).*

The importance of engaging teachers in concrete tasks as a part of professional development is given some support in a recent study of 34 exemplary professional development activities in mathematics and science, supported by the National Science Foundation, the Department of Education, and other federal agencies (Carey & Frechtling, 1997). As part of an evaluation of these activities, teachers were surveyed about the degree to which the activities included the opportunity to plan how the concepts and materials would be used in the classroom, as well as the opportunity to engage in hands-on activities, challenging problem solving, and the development of curriculum units. Carey and Frechtling indicate that teachers who participated in activities that offered these opportunities reported more change in knowledge, skills, and teaching practices than teachers in activities that did not afford these opportunities.

In the following paragraphs, we examine the degree to which opportunities of this kind are provided in our national sample of Eisenhower-assisted activities. Although we do not have information on the extent to which a particular strategy was used in an activity nor whether it was used in conjunction with conceptual, in-depth learning, we do have information on the prevalence of several types of learning strategies. We focus in particular on four dimensions of active learning: observing and being observed teaching; planning for classroom implementation; reviewing student work; and presenting, leading, and writing.

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## Observing and Being Observed

One element of active learning is the opportunity for teachers to observe expert teachers and be observed teaching in their own classroom and obtain feedback. These opportunities can take a variety of forms. Videotaped lessons, for example, can offer participants an opportunity to observe lesson content, teaching strategies, and student learning. Teachers can visit each others' classrooms to observe lessons. Activity leaders, lead teachers, mentors, and coaches can observe classroom teachers and engage in reflective discussions about the goals of a lesson, the tasks employed, teaching strategies, and student learning.

Eisenhower funds were used to support in-depth opportunities for observation in West City, Connecticut, one of our exploratory case sites. As part of the portfolio of activities offered with Eisenhower support in West City, two skilled in-house facilitators provide coaching and support for elementary teachers, including demonstration lessons and help with planning. Teachers who receive intensive coaching generally spend one to two hours per week in pre-lesson discussion, demonstration lessons, and post-lesson feedback.

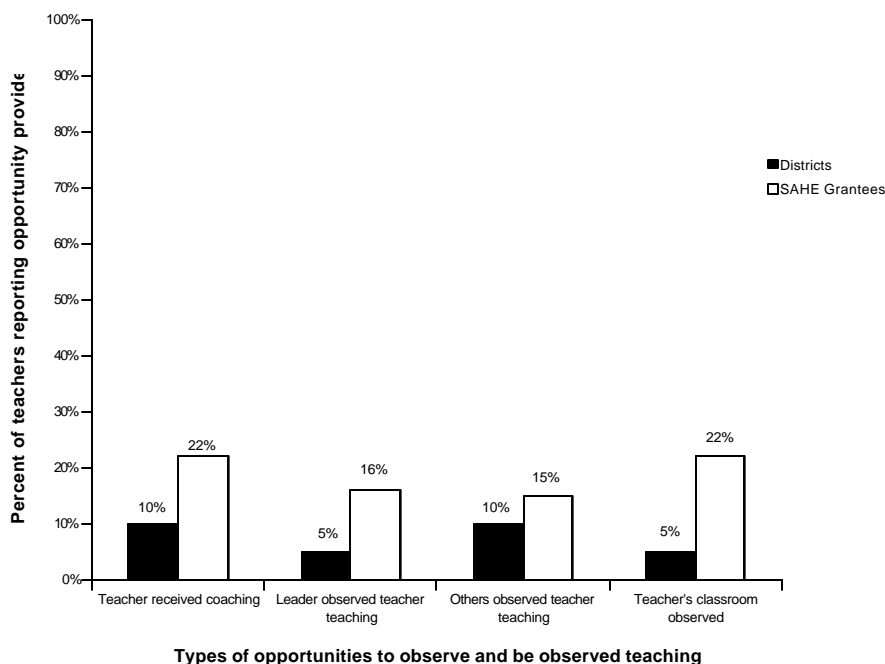
To determine the frequency with which opportunities of this kind are provided as part of Eisenhower-assisted activities, we asked each teacher in our national sample how the activity helped the teacher use new skills in the classroom. In particular, we asked each teacher whether the teacher received coaching or mentoring in the classroom as part of the Eisenhower-assisted activity; whether the teacher's teaching was observed by the activity leader(s) and feedback was provided; and whether the teacher's teaching was observed by other participants and feedback was provided. We also asked whether the activity was evaluated in part based on an observation of the teacher's classroom.

The results, shown in Exhibit 3.6, indicate that relatively few teachers report opportunities to observe and be observed as part of Eisenhower-assisted activities, but, overall, SAHE-grantee activities provide more opportunities for classroom observation than do district activities. For example, 22 percent of teachers in SAHE-grantee activities report being coached in the classroom as part of the activities in which they participated, compared with 10 percent of teachers in district activities. Similar differences appear in the percentage of teachers who report being observed by the leader (16 versus five percent), who report being observed by other teachers (15 versus 10 percent), and who report that the activity was evaluated in part based on observation (22 versus five percent).



## EXHIBIT 3.6

### Percent of Teachers Reporting That They Had Opportunities to Observe or Be Observed Teaching in Eisenhower-assisted Professional Development Activities (District n=783, SAHE Grantee n=244)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first bar shows that 10 percent of the teachers who participated in district activities report that they had an opportunity to receive coaching or mentoring in the classroom. Each bar and the number on the top of it represent the percent of teachers for each category.

**Note:** “Districts” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. “SAHE Grantees” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

## Planning Classroom Implementation

A second element of active learning involves the opportunity to link the ideas introduced during professional development experiences to the teaching context in which teachers work. The introduction of new approaches may have different implications depending on the curriculum in place in a teacher’s school, the specific textbooks adopted in the teachers’ classrooms, and the required assessments in the teachers’ districts, as well as the characteristics of the students enrolled in the teachers’ classrooms, including the material covered in previous grades and students’ expectations for classroom instruction.

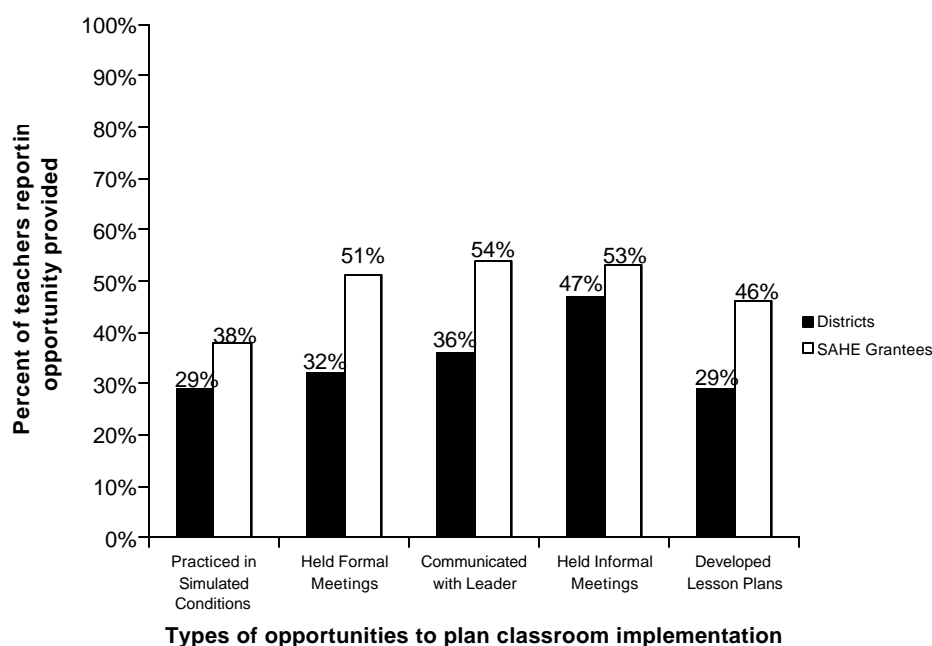
To assess the extent to which Eisenhower activities provided teachers with opportunities to plan classroom implementation, we asked each teacher in our national sample whether, as part of the activity in which the teacher participated, the teacher practiced under simulated conditions, with

feedback; met formally with other activity participants to discuss classroom implementation; communicated with the leader(s) of the activity concerning classroom implementation; met informally with other participants to discuss classroom implementation; and developed curricula or lesson plans that other participants or the activity leader reviewed.

Exhibit 3.7 shows that opportunities to plan classroom implementation are a more common part of Eisenhower-assisted activities than opportunities to observe and be observed teaching. But, as in our results for observation, SAHE-grantee activities are more likely to provide opportunities for planning than are district activities. For example, 32 percent of teachers participating in district Eisenhower-assisted activities report that the activities in which they participated provided the opportunity to discuss classroom implementation, as do 51 percent of teachers in SAHE-grantee activities. Similarly, 36 percent of teachers in district activities report that the activity provided an opportunity to communicate with the leader about classroom implementation, as do 54 percent of teachers in IHE/NPO activities.

### EXHIBIT 3.7

#### Percent of Teachers Reporting Opportunities to Plan Classroom Implementation in Eisenhower-assisted Professional Development Activities (District n=783. SAHE Grantee n=244)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first bar shows that 29 percent of the teachers who participated in district activities report that they had an opportunity to practice under simulated conditions. Each bar and the number on the top of it represent the percent of teachers for each category.

**Note:** "Districts" refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. "SAHE Grantees" refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

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## **Reviewing Student Work**

Another element of active learning is the opportunity to examine and review student work. By examining students' written responses to problems, for example, teachers may gain an understanding of students' preconceptions, misconceptions, and solution strategies (Schifter, 1996; Carpenter et al., 1989). And, by observing students' responses to questions posed by expert teachers, teachers may gain insight into students' assumptions and reasoning. Well-presented examples of student work can provide insight into the types of difficulties students are likely to have with complex subject matter and the materials and teaching strategies that are likely to be effective. In particular, examples of student work may help teachers develop skills in diagnosing student problems and designing lessons at an appropriate level of difficulty. Finally, by discussing examples of students' work, teachers may develop shared interpretations of the kinds of problems that are easy and difficult and the standards of performance against which students should be held.

To determine the extent to which opportunities to review student work are provided as part of Eisenhower-assisted activities, we asked each teacher in our national sample whether the teacher reviewed student work or scored assessments as part of the activity; we asked whether work completed by students in the teacher's classroom were reviewed by other activity participants or the activity leader; and we asked whether student outcomes were examined as part of an evaluation of the activity.

The results, shown in Exhibit 3.8, indicate that opportunities to review student work are relatively rare, although they are somewhat more common in SAHE grantee than district activities. For example, 19 percent of teachers in district Eisenhower activities reported that the activities provided an opportunity to review student work, as did 26 percent of teachers in SAHE-grantee activities; and nine percent of teachers in district activities scored assessments, as did 13 percent of teachers in IHE/NPO activities.

## **Presenting, Leading, and Writing**

Apart from opportunities to observe teaching, plan classroom implementation, and review student work, professional development activities may also offer teachers the opportunity to give presentations, lead discussions, and produce written work. Active participation of this kind may improve outcomes by permitting teachers to delve more deeply into the substantive issues introduced.

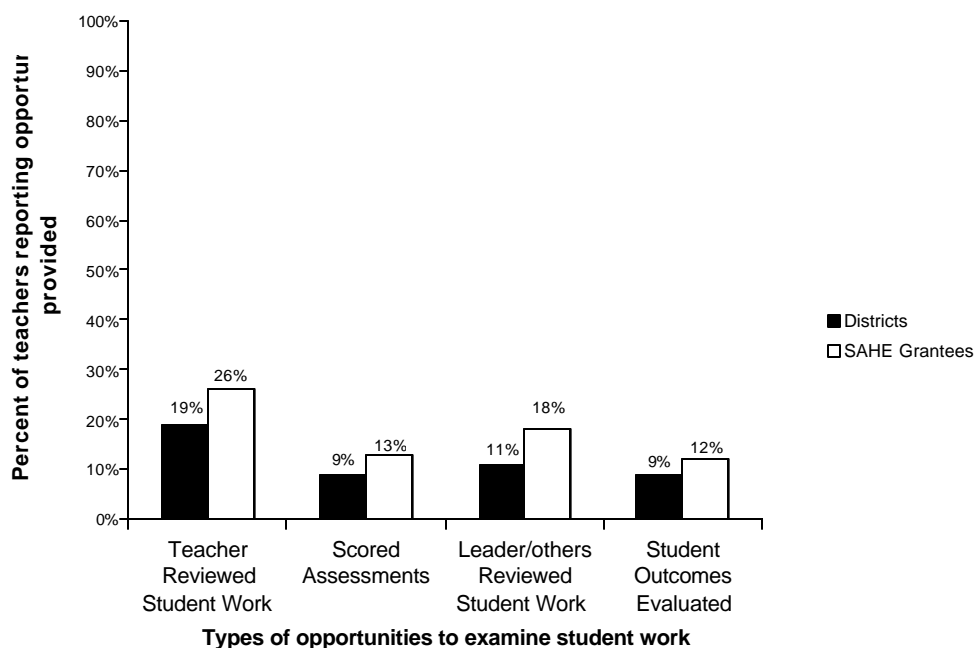
To examine the degree to which these forms of active participation are provided as part of Eisenhower-assisted activities, we asked each teacher in our national sample whether, as part of the activity, the teacher gave a lecture or presentation; conducted a demonstration of a lesson, unit, or skill; led a whole-group discussion; led a small group discussion; or wrote a paper, report, or plan.

The results, shown in Exhibit 3.9, indicate that three of these forms of active learning—giving a lecture or presentation, conducting a demonstration, and writing a report—are relatively common, at least among SAHE-grantee activities. Overall, 42 percent of teachers in SAHE-grantee activities report giving a lecture or presentation as part of the activity in which they participated, 43 percent conducted a demonstration, and 44 percent wrote a paper or report. Fewer teachers who participated in district activities report these kinds of opportunities: 18 percent of teachers in district Eisenhower-assisted activities report giving a lecture or presentation, 24 report conducting a demonstration, and 15 percent report writing a paper.

Relatively few teachers in either district or SAHE-grantee activities led whole-group or small-group discussions, although discussion is often emphasized as a strategy to be encouraged in the teaching of mathematics and science.

### EXHIBIT 3.8

#### Percent of Teachers Reporting Opportunities to Examine Student Work in Eisenhower-assisted Professional Development Activities (District n=783, SAHE Grantee n=244)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

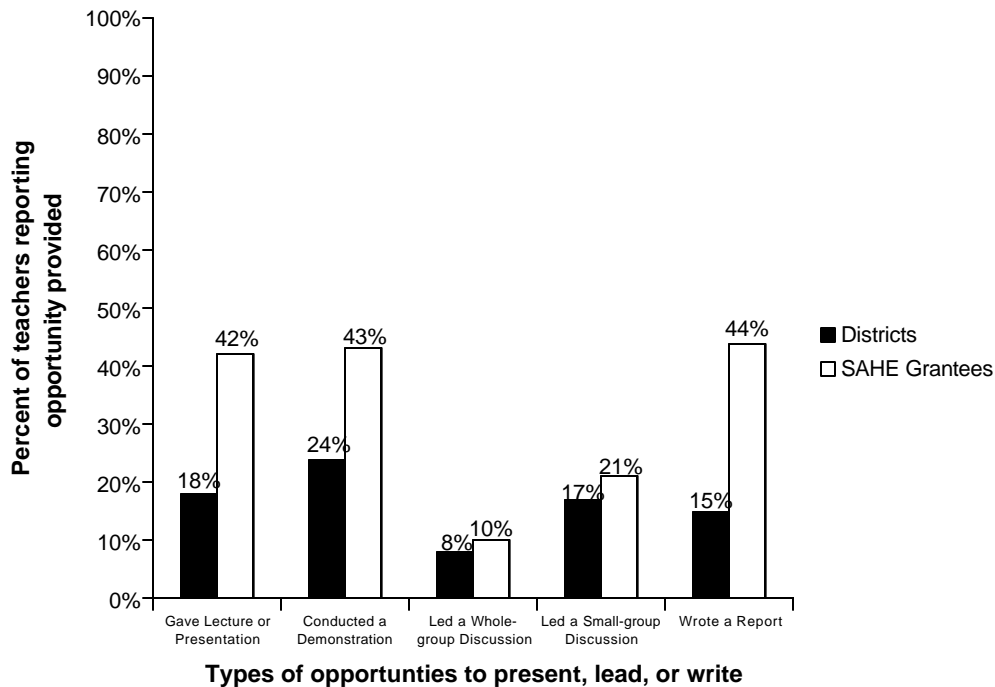
**How to read this exhibit:** The first bar shows that 19 percent of the teachers who participated in district activities report that they had an opportunity to review student work. Each bar and the number on the top of it represent the percent of teachers for each category.

**Note:** "Districts" refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. "SAHE Grantees" refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

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## EXHIBIT 3.9

### Percent of Teachers Reporting Opportunities to Present, Lead, and Write in Eisenhower-assisted Professional Development Activities (District n=783, SAHE Grantee n=244)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first bar shows that 18 percent of the teachers who participated in district activities report that they had an opportunity to give a lecture or presentation. Each bar and the number on the top of it represent the percent of teachers for each category.

**Note:** “Districts” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. “SAHE Grantees” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

### Overall Index of Active Learning

In the previous sections, we have focused on the extent to which Eisenhower-assisted activities provide specific types of opportunities—for example, the opportunity to be observed teaching by the activity leader, score student assessments, develop a lesson plan, or write a report. The description we have provided of the frequency with which each of these types of opportunities is offered provides one way of assessing the degree to which Eisenhower-assisted activities support active learning.

A complementary approach to examining active learning is to ask how many different types of active learning opportunities Eisenhower-assisted activities generally provide. While it is not clear that a particular number or combination of active learning strategies is necessarily more

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effective, activities that support multiple forms of active learning may be able to integrate these opportunities to provide strong supports for teacher change.

An Eisenhower-assisted activity provided by a SAHE-sponsored IHE in Texas, one of our in-depth case states, illustrates the ways a varied set of approaches for active learning can build upon one another to facilitate teacher development. Nineteen teachers participated in the 6<sup>th</sup>-Grade Physical Science Enhancement and Math Integration program offered by the IHE. The program was designed to create a support system to help teachers implement teaching practices consistent with the national standards in mathematics and science and the Texas Essential Knowledge and Skills. During a six-week summer institute, teachers kept journals, model classrooms were used to help teachers learn new strategies, and instructors videotaped teachers in the classroom and provided feedback. In addition, the project encouraged participants to form a network to provide support during the school year. Finally, the activity leaders spent about 200 hours in the teachers' classrooms during the following school year, observing and providing follow-up and guidance.

To examine the number of types of active learning opportunities of this kind provided in the activities in which our national sample of teachers participated, we created a composite index, summing all of the types shown in Exhibits 3.6, 3.7, 3.8, and 3.9. Because our survey included four items to measure opportunities for observation, five for planning, four for reviewing student work, and five for presenting/writing, simply summing the 18 types of opportunities included would give more weight to planning and presenting/writing than to observing and reviewing student work. Thus, in computing the index, we weighted each of the four items pertaining to observation and the four items pertaining to student work by 1.25. This produces an index that runs from zero (no opportunities were provided for active learning) to 20 (all types of active learning were provided).

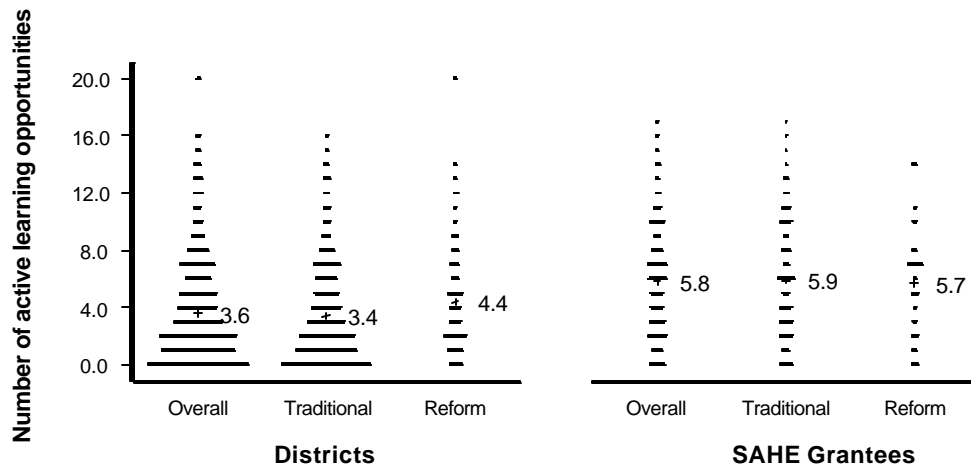
The results, shown in Exhibit 3.10, indicate that activities vary widely in the number of opportunities they provide for active learning, but, overall, SAHE-grantee activities provide more opportunities for active learning than district activities. On the average, teachers report that district activities provide 3.6 types of active learning (of the maximum of 20 possible on the scale), but the range is enormous. About 21 percent of teachers are in district activities that provide no opportunities for active learning, while some are in activities providing more than eight types. On the average, teachers in SAHE-grantee activities report 5.8 types of active learning, although, as for districts, there is a wide range. About nine percent of teachers in SAHE-grantee activities report no opportunities for active learning.

As anticipated, reform activities tend to offer more opportunities for active learning than traditional activities, for activities supported through the district component of the program. On average, teachers participating in district reform activities report 4.4 types of active learning, compared with 3.4 types for traditional activities. There is little difference in opportunities for active learning between traditional and reform activities supported through the SAHE component of the program.

Our data on active learning opportunities suggest that some Eisenhower-assisted activities—particularly those supported in the SAHE component of the program—provide a diverse set of active learning activities. But many Eisenhower-assisted activities—especially traditional activities supported under the district component of the program—do not yet incorporate the kinds of active learning opportunities the literature suggests are required to support ongoing improvement in teacher knowledge, skills, and teaching practice. Thus, this is an area in which further program improvement efforts might focus.

## EXHIBIT 3.10

### Number of Opportunities for Active Learning in Eisenhower-assisted Professional Development Activities, as Reported by Teachers (District n=767, SAHE Grantee n=244)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first distribution shows that on average, those teachers who participated in district activities reported that they were given 3.6 opportunities for active learning, where 0 indicates no opportunity and 20 indicates full opportunities on all 18 different active learning items. Traditional vs. reform types of activities differed significantly in the opportunities for active learning for the district component activities, but not for the SAHE-grantee component activities. Each dot represents one teacher. As the number of teachers at one data value increases, the dots form a horizontal line that increases in length. Each distribution represents the distribution of teachers for that particular category. The number to the right of the distribution is the mean.

**Note:** “Districts” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. “SAHE Grantees” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

## Nurturing Coherence

The third core feature of professional development concerns the extent to which professional development activities are perceived by teachers to be a part of a coherent program of teacher learning. Up until this point, in examining the quality of professional development activities supported by the Eisenhower program, we have focused on experiences that occur as part of the activity itself—the content covered and the opportunities for active learning provided. To some extent, however, the quality of a professional development experience is also a function of the relationship of the experience itself to other aspects of a teacher’s work (Darling-Hammond & McLaughlin, 1996). Developing coherent knowledge-based visions are important conditions for learning (McCarthy & Peterson, 1993). Professional development for teachers is frequently criticized on the ground that the activities are disconnected from one-another—in other words, individual activities do not form part of a coherent program of teacher learning and development. A professional development activity is more likely to be effective in improving teachers’ knowledge and skills if it forms a coherent part of a wider set of opportunities for teacher learning and development.

The coherence of a teacher’s professional development experience can be assessed in at least three ways. First, coherence can be judged in terms of the degree to which an individual professional

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development activity builds on what teachers have already learned and is followed up with other, more advanced work. The coherence of an activity can also be judged in terms of the extent to which the activity emphasizes content and pedagogy aligned with national, state, and local standards, frameworks, and assessments. Finally, the coherence of an activity can be judged on the basis of the extent to which the activity supports teachers in developing sustained, ongoing professional communication with other teachers who are trying to change their teaching in similar ways.

In the following sections, we consider each of these aspects of coherence in turn.

### **Connections with Goals and Other Activities**

One way to assess whether a professional development activity is part of a coherent program of teacher learning is to ask whether the activity builds on earlier activities and is followed up with later, more advanced work. Are the individual professional development opportunities provided for teachers linked so they build upon one another? Do professional development activities make it possible for teachers to advance from more basic to more advanced topics and skills, covered in greater depth? Or, do professional development opportunities tend to repeat content from earlier activities, at the same depth?<sup>23</sup>

Furthermore, are the opportunities provided linked to teachers' goals for development? Do teachers perceive that the available activities are central to the issues of teaching and learning that they believe need more attention?

To address these issues, we asked each teacher in our national sample to report the extent to which the activity the teacher attended was consistent with the teacher's goals for professional development; based explicitly on what the teacher had learned in earlier professional development experiences; and followed up with activities that built upon what was learned in this professional development activity. Teachers responded on a scale from one to five, where one=not at all and five=to a great extent.

The results, shown in Exhibit 3.11, indicate that almost all teachers believe the Eisenhower-assisted activities in which they have participated are consistent with their goals: 79 percent of teachers in district activities report that the activities in which they participated were quite consistent with their goals (that is, they reported a value of four or five on the five-point response scale); and 88 percent of teachers in SAHE-grantee activities reported that the activities were consistent with their goals.

Many fewer teachers report that the Eisenhower-assisted activities build upon earlier activities: 35 percent of teachers in district activities and 39 percent of teachers in SAHE-grantee activities report that the activity built on earlier activities.

Somewhat more teachers report that the Eisenhower-assisted activities in which they participated were *followed up* with additional activities than reported that Eisenhower-assisted activities *built upon* earlier work. About 53 percent of teachers in district activities report that they were followed up with more advance work, as did 70 percent of teachers in SAHE-grantee activities.

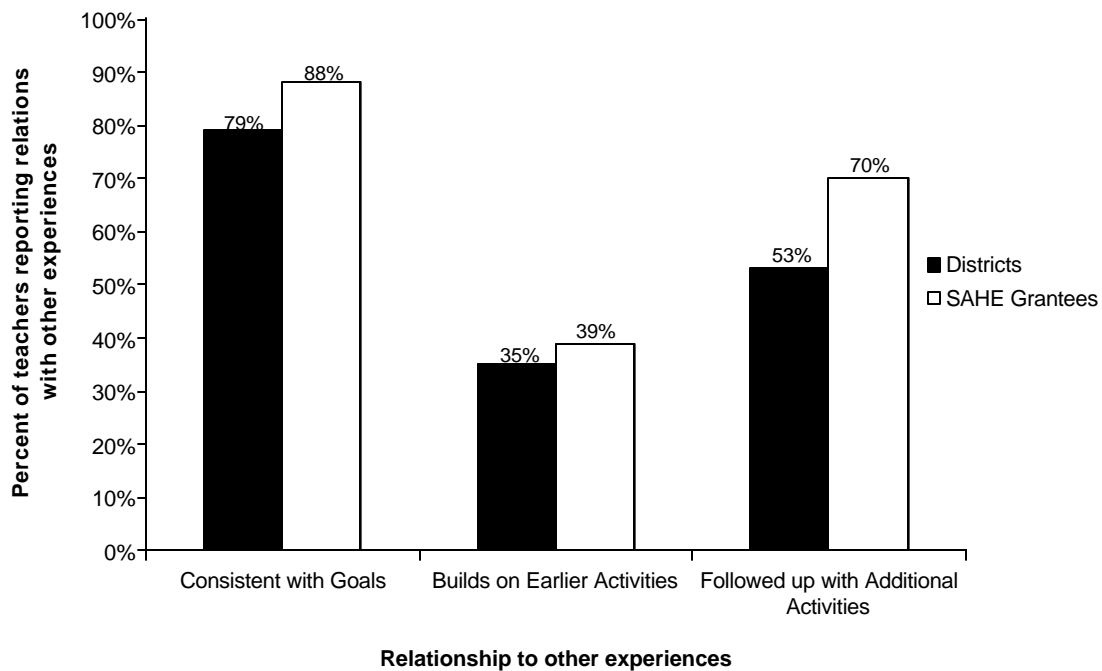
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<sup>23</sup> To some extent, the issues here are parallel to those posed in assessing the learning opportunities provided for students.



## EXHIBIT 3.11

Percent of Teachers Reporting That Eisenhower-assisted Professional Development Activities are Related to Their Other Professional Development Experiences (District n=748 to 760, SAHE Grantee n=238 to 239)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first bar shows that 79 percent of the teachers who participated in district activities report that the activity was consistent with their own goals. Each bar and the number on the top of it represent the percent of teachers for each category.

**Note:** "Districts" refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. "SAHE Grantees" refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program. Due to missing data, the district n ranges from 748 to 760 and the SAHE Grantee n ranges from 238 to 239.

### Alignment with State and District Standards and Assessments

A second aspect of coherence concerns the alignment of the content and pedagogy emphasized in the activities with national, state, and local frameworks, standards, and assessments. Teachers receive guidance about what to teach and how to teach it from multiple sources, including the material covered in formal professional development, as well as in their pre-service education, textbooks, national standards, state and local policies and assessments, and the professional literature (Cohen & Spillane, 1992). To the extent that these sources provide a coherent set of goals for teaching and learning, they may facilitate teachers' efforts to improve their teaching practices. To the extent that they conflict, however, the sources of guidance may create tensions that impede teachers' efforts to develop their teaching in a consistent direction (Grant, Peterson, & Shojgreen-Downer, 1996).

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Efforts to align professional development with state and district frameworks, standards, and assessments offer one approach to increasing the coherence of the instructional guidance teachers receive. The process of aligning professional development with state and district standards and other policies can take a number of forms. For example, professional development activities can be chosen to reflect the topics emphasized in state and district standards. Or, professional development activities can focus on the goals for student learning emphasized in state assessments or the pedagogical methods emphasized in state curriculum frameworks (Webb, 1998).

A professional development activity in Riverside, Washington, one of our case-study districts, illustrates the use of Eisenhower funds to encourage professional development that is aligned with standards. The Riverside Elementary Science Kit project is an ongoing process that started in 1990, when teachers began attending a series of extended workshops on science concepts. After several years of related workshops, building from simple to more advanced topics, between 30 and 50 teachers were prepared and ready to begin creating kits. They began creating three to four kits in each grade level: one concept kit, and two or three content kits per grade.

Thirty-one kits have now been completed, focusing on earth, life, and physical science. Currently, Eisenhower-assisted workshops are being used to develop standards for the scoring of the student work included in the kits. These workshops are designed to help match state and national learning standards to the scoring methods used for the kits. After completing the workshops, the teachers are expected to know which state and national standards the science kits satisfy, and they should be able to understand the goals for student learning embodied in each kit.

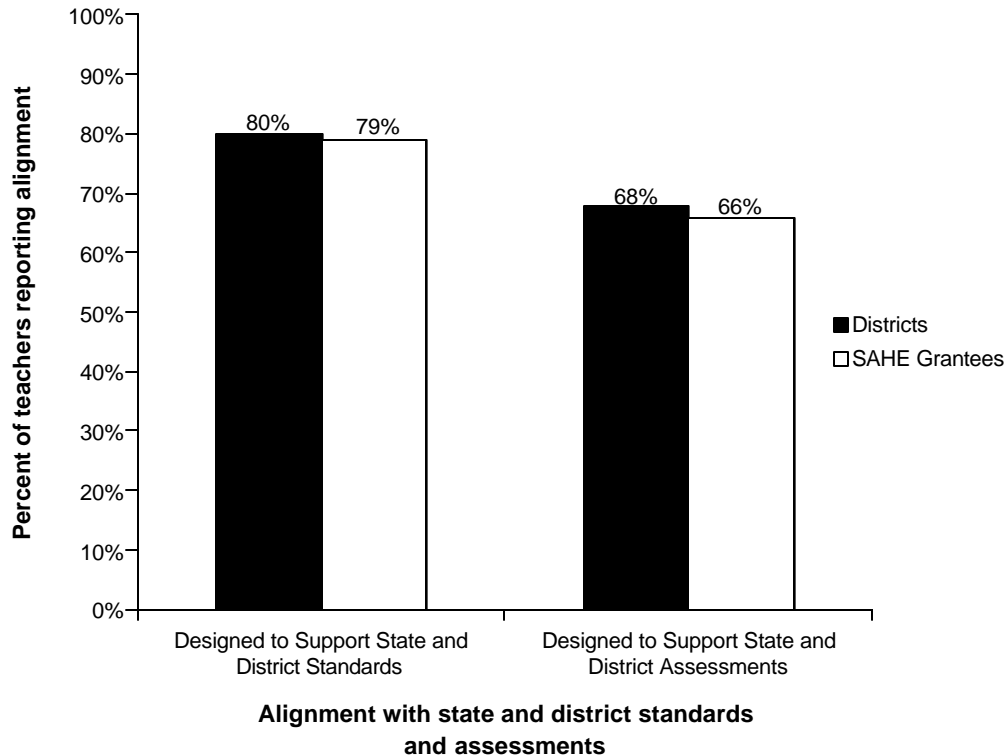
To obtain a measure of the alignment of Eisenhower-supported professional development with state and district standards, we asked each teacher in our national sample to indicate the extent to which the activity in which the teacher participated was aligned with state or district standards and curriculum frameworks, and with state and district assessments. Teachers were asked to respond using a five-point scale, from 1=not aligned at all to 5=aligned to a great extent.

The results, displayed in Exhibit 3.12, show that most teachers report that the activities they participated in were aligned with state and district standards, frameworks, and assessments, although teachers report somewhat more alignment between professional development with standards and frameworks than assessments. Overall, 80 percent of teachers participating in Eisenhower-assisted activities report that the activities were well aligned with state and district standards (reporting a four or five on the five-point scale), while 68 percent report that the activities were well aligned with state and district assessments. The results for SAHE-grantee activities are nearly identical. Although our data do not permit us to judge the depth of the alignment reported in our surveys, our results do indicate that teachers perceive that the activities in which they participate are quite consistent with state and district standards and frameworks, and moderately consistent with state and district assessments.

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## EXHIBIT 3.12

### Percent of Teachers Reporting That Their Eisenhower-assisted Activities are Aligned with State and District Standards, Frameworks, and Assessments (District n=748 to 753, SAHE Grantee n=238)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first bar shows that 80 percent of the teachers who participated in district activities report that the activity was designed to support state or district standards. Each bar and the number on the top of it represent the percent of teachers for each category.

**Note:** “Districts” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. “SAHE Grantees” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program. Due to missing data, the district n ranges from 748 to 753; the SAHE Grantee n is 238.

## Communication with Others

The third dimension of coherence concerns the ways in which professional development activities encourage professional communication among teachers who are engaged in efforts to reform their teaching in similar ways. Efforts to change teaching practices generally engender problems, challenges, and dilemmas as teachers attempt to carry out in the classroom ideas that were introduced in professional development activities. An ongoing discussion among teachers who confront similar issues can facilitate change by encouraging the sharing of solutions to problems, as well as by reinforcing the sense that, with time, improvement is possible. There is some evidence, for example, that networks of teachers involved in change can help sustain motivation (Lieberman & McLaughlin, 1992). In addition, by sharing methods, discussing written work, and reflecting on

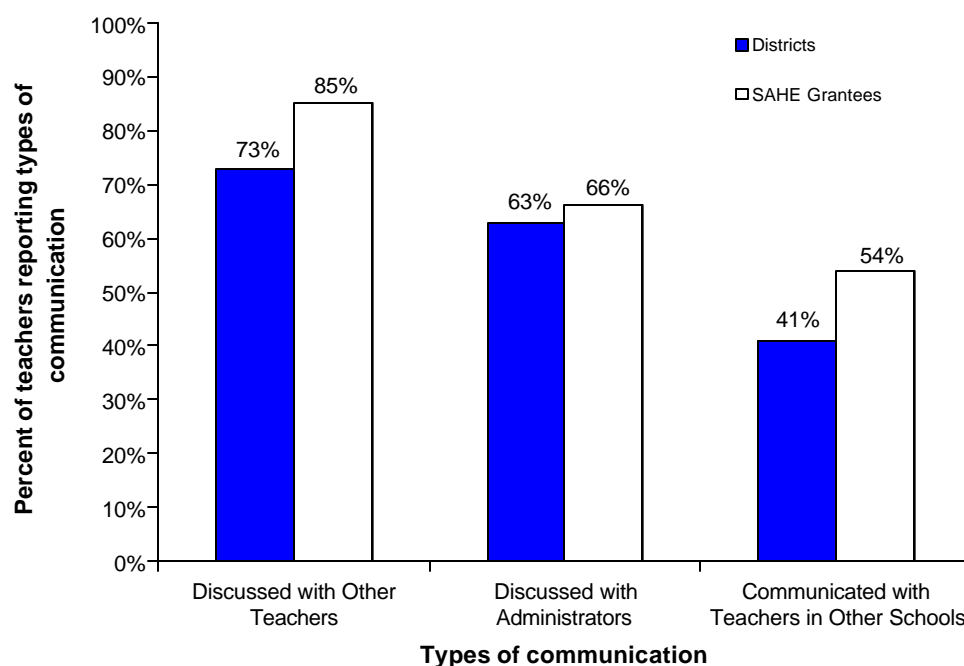
problems and solutions, teachers may foster a better understanding of the goals for student learning that proposed changes in teaching imply. Communication with other teachers is another dimension of coherence.

To measure the extent to which teachers in our national sample were encouraged to establish professional communication as part of the Eisenhower-assisted activities in which they participated, we asked the teachers whether they had discussed what they learned with other teachers in their school or department *who did not attend* the activity; whether they had discussed or shared what they learned with *administrators* (e.g., principal or department chair); and whether they had communicated, outside of formal meetings held as part of the activity, with participants in the activity who teach in other schools.

The results are shown in Exhibit 3.13. The data indicate that most teachers report discussing what they learned with other teachers in their school who did not attend the professional development activity, and most also discuss what they learned with school administrators. Somewhat fewer teachers, however, report communicating with teachers in other schools.

### EXHIBIT 3.13

#### Percent of Teachers Reporting That They Communicate with Other Teachers About Their Experiences in Eisenhower-assisted Professional Development Activities (District n=783, SAHE Grantee n=244)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first bar shows that 73 percent of the teachers who participated in district activities report that they discussed what they learned with other teachers in their school who did not attend the activity. Each bar and the number on the top of it represent the percent of teachers for each category.

**Note:** “Districts” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program.

“SAHE Grantees” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

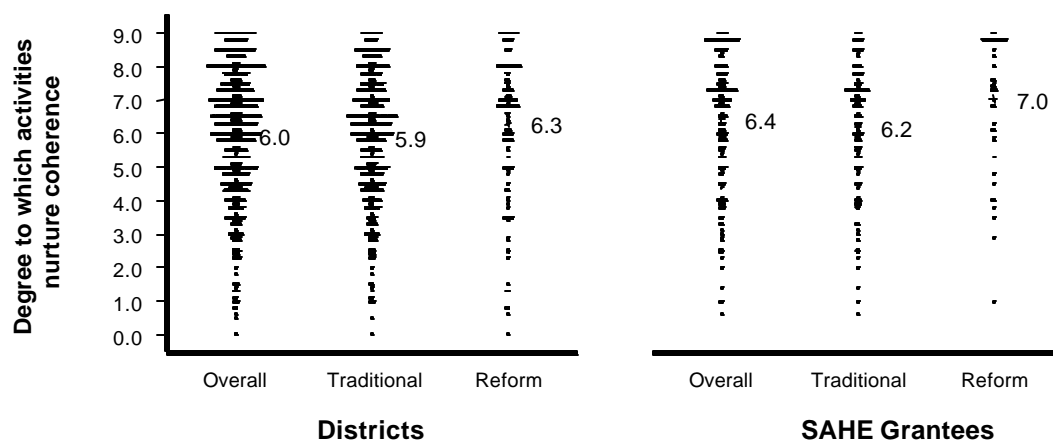
## Overall Index of Coherence

To provide a composite measure of the overall extent to which Eisenhower-assisted activities are a part of a coherent program of professional development, we combined the items that comprise our three specific dimensions of coherence. The composite sums the items shown in Exhibits 3.11, concerning connections to teachers' goals and other professional development experiences; Exhibit 3.12, concerning alignment; and Exhibit 3.13, concerning professional communication. Because three items are available for the first and third of these dimensions, while only two items are available for the second, we weighted the items for the second dimension by 1.5. This produces a scale that runs from zero (the activity did not include any of the types of coherence we measured) to nine (the activity provided all of the forms we measured).

The results, displayed in Exhibit 3.14, indicate that both district and SAHE-grantee activities incorporate many of the features of coherence we measured, although the variation across activities is substantial. The average number of types of coherence reported for district activities is 6.0 (on our 0-9 scale), and the average for SAHE-grantee activities is 6.4. Reform activities incorporate somewhat more forms of coherence than traditional activities (6.3 versus 5.9 for districts, and 7.0 versus 6.2 for SAHE grantees).

### EXHIBIT 3.14

#### Degree to Which Eisenhower-assisted Professional Development Activities Foster Coherence, as Reported by Teachers (District n=747, SAHE Grantee n=235)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first distribution shows that on average, those teachers who participated in district activities reported that the activity provides a 6.0 coherence scale score, where zero indicates no coherence and 9.0 indicates full coherence on all eight different coherence items. Compared to the traditional types of activities, reform types were significantly higher in terms of coherence. Each dot represents one teacher. As the number of teachers at one data value increases, the dots form a horizontal line that increases in length. Each distribution represents the distribution of teachers for that particular category. The number to the right of the distribution is the mean.

**Note:** "Districts" refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. "SAHE Grantees" refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

These results indicate that most teachers perceive Eisenhower-assisted activities to be integrated in a variety of ways into their professional lives. This clearly suggests that progress has been made since the previous Eisenhower evaluation, when Eisenhower-assisted activities were

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described as “one-shot” (Knapp et al., 1991). Given the survey data we have available, we cannot be sure how deeply integrated Eisenhower-assisted activities are into the fabric of teachers’ professional work, but we can conclude that many activities are fostering important linkages with teachers’ other professional development, state and district standards, and other teachers.

In addition, as we had anticipated, reform activities are more likely to foster coherence than traditional activities, such as workshops and institutes. Because reform types of activities, such as mentoring, coaching, and study groups, frequently take place during the regular school day, it is undoubtedly easier for such activities to foster communication among teachers. The fact that reform activities are tied to the daily life of the school may also help such activities foster other aspects of coherence—particularly alignment with standards.

## **Summary: Core Features**

Our results on the core features of Eisenhower-assisted professional development activities provide a mixed picture. We examined three core dimensions of the professional development activity: content focus, active learning, and coherence. With respect to the first, most teachers participating in Eisenhower-assisted activities report that the activities in which they participated placed a major emphasis on deepening their content knowledge in mathematics and science. This is quite encouraging, given the conclusions in recent literature on the potential benefits of professional development focused on specific subject-matter content (Kennedy, 1998; Cohen & Hill, 1998).

With respect to opportunities for active learning, the results appear less positive. While most teachers report that the Eisenhower-assisted activities in which they participated provide an opportunity to plan classroom implementation and to give presentations or demonstrations, relatively few provide an opportunity for teachers to observe or be observed or to examine student work. There is a growing body of research to suggest that these forms of active learning are critical components of effective professional development (Schifter, 1996; Carpenter et al., 1989). If so, Eisenhower-assisted activities do not completely meet standards of high quality in this respect.

Finally, with respect to coherence, our results are reasonably positive. Most teachers report that the activities in which they participated were connected to their goals for professional development and other professional learning opportunities, aligned with state and district standards and assessments, and led to professional communication with other teachers.

Our results also support two other conclusions. First, teachers participating in activities supported through the SAHE component of the program are more likely to report that the activities emphasized mathematics and science content, have opportunities for active learning, and more aspects of coherence than teachers participating in district activities. As we will discuss later in this chapter, these differences can be explained in part by the longer duration of SAHE-grantee activities.

In addition, our results indicate that reform activities are more likely than traditional activities to provide active learning opportunities and more likely to encourage coherence. The differences between reform and traditional types of professional activities in opportunities for active learning are not as large as the differences between SAHE-grantee and district activities, however, and, in relation to the overall variation among activities, are only moderate in size. The reform-traditional differences in coherence are larger, however, suggesting that reform activities are especially valuable in encouraging integration of professional development with other aspects of teachers’ work.

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Our results provide evidence that can be used to assess the Eisenhower program with respect to two of the Department of Education’s Performance Indicators for the program (see box). The first indicator, pertaining to alignment, sets as a standard that over 50 percent of teachers participating in Eisenhower-assisted activities will participate in activities that are aligned with high standards. As shown in Exhibit 3.12, 80 percent of teachers participating in Eisenhower-assisted activities report that the activities were designed to support state and district standards—far more than the standard of 50 percent. We do not know the depth of alignment this represents, nor whether the state and district standards with which Eisenhower activities are aligned are truly “high.” But these results are encouraging.

**Indicator 2.1 District-level Professional Development.** By 1998, over 50 percent of teachers participating in district-level or higher education Eisenhower-assisted professional development will participate in activities that are aligned with high standards. By 2000, over 75 percent will.

**Indicator 3.1 High Quality.** By 1998, over 50 percent of teachers participating in district-level, Eisenhower-assisted professional development activities will participate in activities reflecting best practices, including a focus on continuous improvement. By 2000, over 75 percent will.

The second indicator, pertaining to quality, sets as a standard that over 50 percent of teachers participating in Eisenhower-assisted professional development will participate in activities that are of high quality. Here, we have multiple measures that can be used. Our data on content focus, the first core feature, indicate that 51 percent of teachers participating in Eisenhower-assisted activities participate in activities that place a major emphasis on content. By this measure, Eisenhower activities meet the standard set in the indicator. Our data on the active learning, the second core feature, are more mixed; fewer than 50 percent of teachers are in activities providing some of the key dimensions of active learning, such as the opportunity to observe and be observed, or the opportunity to review student work (see Exhibits 3.7 and 3.8). While more teachers report opportunities to plan classroom implementation and to conduct presentations and demonstrations, less than half of teachers in district activities report most of these experiences. Finally, our data on coherence, the third core feature, are reasonably positive. More than 50 percent of teachers participating in district activities report that the activities in which they participated are consistent with their goals were followed up with later experiences, were aligned, and nurtured professional communication.

In the next section, we turn our attention from the core features of Eisenhower-assisted activities to their reported effects on teacher knowledge, skills, and teaching practices.

## TEACHER OUTCOMES

### Section Findings

- ◆ *Many teachers report that participation in Eisenhower-assisted activities enhanced their knowledge and skills. For example, almost half of the teachers participating in district Eisenhower activities report that participation enhanced their knowledge of mathematics and science; nearly 70 percent of teachers participating in IHE/NPO activities report enhanced knowledge of mathematics and science.*

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- ◆ *Many teachers also report improvements in their classroom instruction as a consequence of participation in Eisenhower-assisted activities. For example, 55 percent of the teachers participating in district Eisenhower activities and 66 percent of teachers participating in IHE/NPO activities report increasing the cognitive challenge of classroom instruction.*

The main goal of the Eisenhower Professional Development Program is to increase teachers' knowledge and skills in order to improve their teaching practice, which in turn will increase student learning and achievement. The law requires that states develop professional development plans designed to give teachers "the knowledge and skills necessary to provide all students the opportunity to meet challenging State content standards and challenging State student performance standards" (Section 2205(B)(2)(b)). Also it requires that LEAs use Eisenhower funds to "give teachers and administrators the knowledge and skills to provide students with the opportunity to meet challenging State or local content standards and student performance standards" (Section 2210(b)(1)).

In the following paragraphs, we examine the extent to which teachers participating in Eisenhower-assisted activities report outcomes consistent with these legislative purposes, focusing first on the extent to which teachers' knowledge and skills are enhanced as a results of participation, and then on improvements in teaching practice.

## **Teacher Knowledge and Skills**

To assess the effects of participation on teachers' knowledge and skills, we asked each teacher in our national sample to indicate the degree to which his or her knowledge and skills were enhanced as a result of participation in the specific Eisenhower-assisted activity that drew the teacher into the sample. We asked each teacher to indicate the extent to which knowledge and skills had been enhanced in each of the following areas:

- ◆ Curriculum (e.g., units, texts, standards)
- ◆ Instructional methods
- ◆ Approaches to assessment
- ◆ Use of technology in instruction (e.g., computers, graphing calculators)
- ◆ Strategies for teaching diverse student populations (e.g., students with disabilities, from underrepresented populations, economically disadvantaged, limited English proficient, range of abilities)
- ◆ Deepening knowledge of mathematics

Teachers reported their responses using a five-point scale, where 1=not at all and 5=to a great extent. Our data, shown in Exhibit 3.15, indicate that teachers who participated in SAHE-grantee activities tended to report more change in their knowledge and skill than teachers who participated in

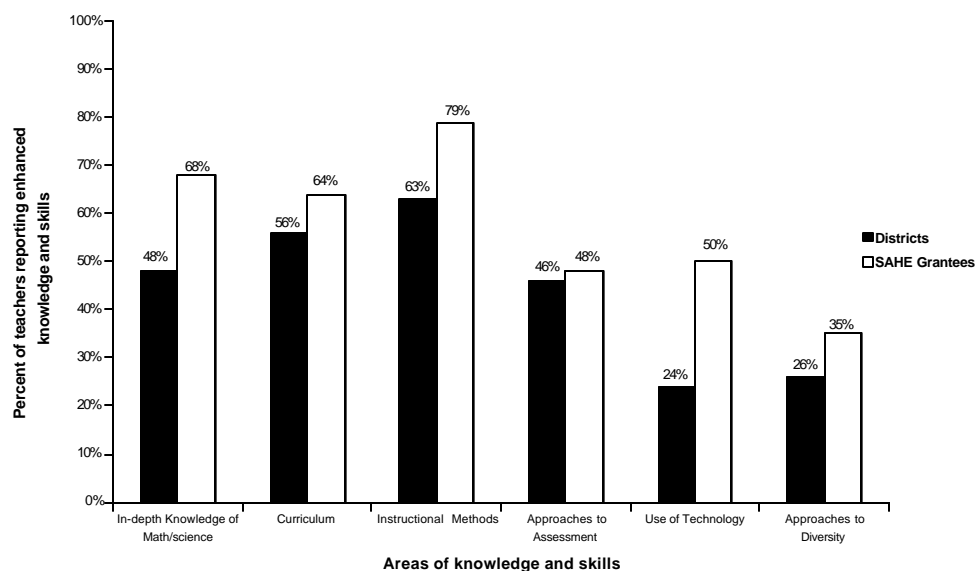


district activities.<sup>24</sup> For example, 68 percent of teachers participating in SAHE-grantee activities reported that their participation led to improvements in their content knowledge in mathematics and science (responding with a four or five on the five-point scale) compared to 48 percent of teachers in district activities. Similarly, 64 percent of teachers in SAHE-grantee activities reported enhanced knowledge and skills in curriculum, and 79 percent in instructional methods, compared with 56 and 63 percent, respectively, for district activities. In addition, teachers in SAHE-grantee activities are substantially more likely to report enhanced knowledge in technology than teachers in district activities (50 percent versus 24 percent), and somewhat more likely to report enhanced knowledge in approaches to diversity (35 percent versus 26 percent).

This pattern differs somewhat for approaches to assessment: 48 percent of teachers in SAHE-grantee activities report enhanced knowledge and skills, as do 46 percent for teachers in district activities, a negligible difference. We are not sure how to explain the lack of difference between districts and SAHE grantees in this domain.

### EXHIBIT 3.15

#### Percent of Teachers Reporting Enhanced Knowledge and Skills Due to Participation in Eisenhower-assisted Professional Development Activities (District n=731 to 750, SAHE Grantee n=233 to 240)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first bar shows that 48 percent of the teachers who participated in district activities report their in-depth content knowledge and skills have been enhanced substantially as a result of professional development. Each bar and the number on the top of it represent the percent of teachers for each category.

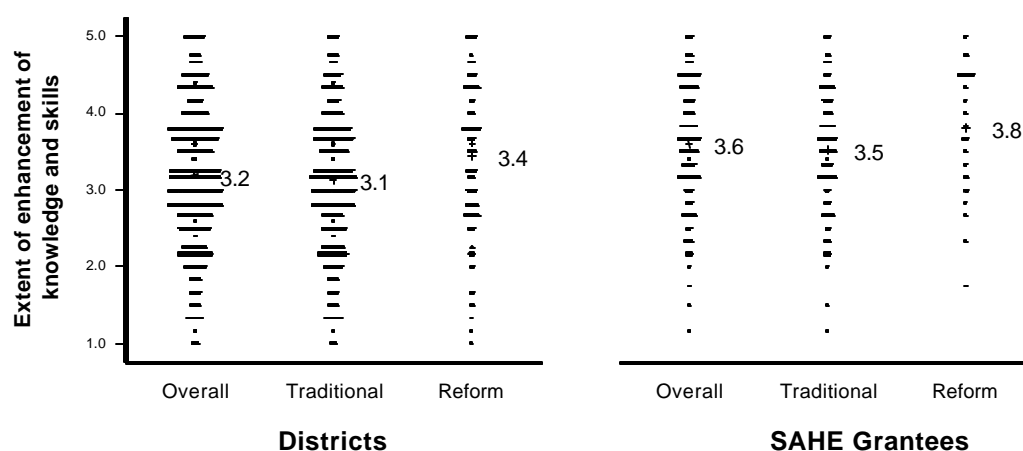
**Note:** “Districts” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. “SAHE Grantees” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program. Due to missing data, the district n ranges from 731 to 750; the SAHE Grantee n ranges from 233 to 240.

<sup>24</sup> Analyses, presented in detail later in the chapter, show that the difference in reported outcomes between districts and SAHE grantees can be explained almost entirely by the fact that SAHE-grantee activities are longer and give more emphasis to content, active learning, and coherence.

We averaged each teacher's responses on these six items to create a composite scale measuring enhanced knowledge and skills. The results are displayed in Exhibit 3.16. One fact immediately visible in the exhibit is the substantial variation among teachers in reported enhancement in knowledge and skills. A few teachers have composite scores of one, meaning no change in knowledge and skills, while a few have composite scores of five, indicating knowledge and skills were enhanced to a great extent in all six domains measured. The average composite score for teachers participating in district activities is 3.2, while the average for teachers in SAHE-grantee activities is 3.6. Our results also indicate that the average enhancement of knowledge and skills is somewhat higher for teachers participating in reform activities than for teachers in traditional activities.

### EXHIBIT 3.16

#### Extent to Which Participation in Eisenhower-assisted Professional Development Activities Enhanced Knowledge and Skills, as Reported by Teachers (District n=750, SAHE Grantee n=240)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first distribution shows that, on average, those teachers who participated in district activities reported that the extent to which their knowledge and skills have been enhanced in six different areas was 3.2, where zero indicates no enhancement and five indicates great enhancement. Compared to traditional types of activities, reform types were significantly higher in terms of enhancement of knowledge and skills. Each dot represents one teacher. As the number of teachers at one data value increases, the dots form a horizontal line that increases in length. Each distribution represents the distribution of teachers for that particular category. The number to the right of the distribution is the mean.

**Note:** "Districts" refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. "SAHE Grantees" refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

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## Change in Classroom Teaching Practice

We conducted a similar analysis of changes in teaching practice. We asked the teachers in our national sample to what extent they made changes in their teaching practices in each of the following domains, as a result of the professional development activity:<sup>25</sup>

- ◆ The mathematics curriculum content
- ◆ The cognitive challenge of math classroom activities
- ◆ The instructional methods employed
- ◆ The types or mix of assessments used to evaluate students
- ◆ The ways technology (calculator or computer) is used in instruction
- ◆ The approaches taken to student diversity.

Teachers were asked to report responses on a scale from 0 to 3, where 0=no change, 1=minor change, 2=moderate change, and 3=significant change.

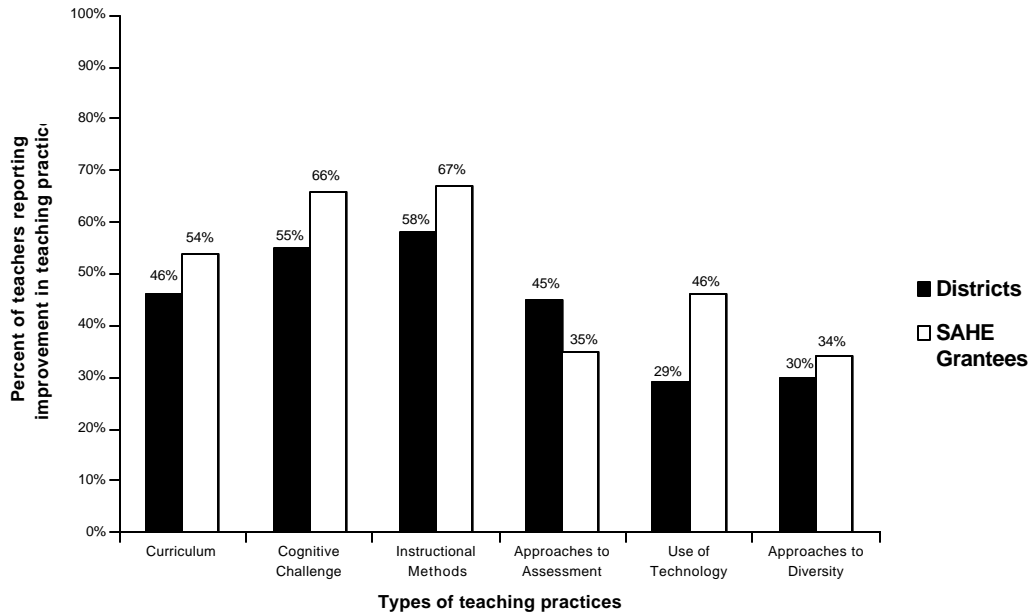
Exhibit 3.17 shows that the results are generally parallel to those for knowledge and skills. The exhibit displays the percent of teachers responding that they made moderate or significant changes in their teaching. In particular, in most domains, teachers in SAHE-grantee activities are more likely to report change in teaching practice than teachers in district activities. However, in one domain—approaches to assessment—teachers in district activities are more likely to report change in practice than teachers in SAHE-grantee activities.

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<sup>25</sup> The results we report here are based on self-report data. In our third report, we will report parallel analyses based on the longitudinal study of teacher change, which includes data on teaching practice in the 1996-97, 97-98, and 98-99 school years.

### EXHIBIT 3.17

#### Percent of Teachers Reporting Improvement in Classroom Teaching Practice Due to Participation in Eisenhower-assisted Professional Development Activities (District n=731 to 750, SAHE Grantee n=233 to 244)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first bar shows that 46 percent of the teachers who participated in district activities report that their teaching practices in the curriculum content area have improved substantially as a result of participation in an Eisenhower-assisted professional development activity. Each bar and the number on the top of it represent the percent of teachers for each category.

**Note:** "Districts" refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. "SAHE Grantees" refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program. Due to missing data, the district n ranges from 731 to 750; the SAHE Grantee n ranges from 233 to 240.

We averaged each teacher's responses to these six items to create a composite scale measuring change in teaching practice. The results appear in Exhibit 3.18. One notable pattern is that some teachers (about 17 percent in district activities and 10 percent in SAHE-grantee activities) report no change in teaching practice in any of the domains we measured. At the same time, some teachers report very high levels of change, with composite scores of 3 (the maximum value) on our scale.

## EXHIBIT 3.18

### Degree of Improvement in Classroom Teaching Practice Due to Participation in Eisenhower-assisted Professional Development Activities, as Reported by Teachers (District n=767, SAHE Grantee n=244)



**Source:** Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.

**How to read this exhibit:** The first distribution shows that, on average, those teachers who participated in district activities reported that the extent of their improvement in classroom teaching practice was 1.3, where zero indicates no change and three indicates the highest degree of change. Each dot represents one teacher. As the number of teachers at one data value increases, the dots form a horizontal line that increases in length. Each distribution represents the distribution of teachers for that particular category. The number to the right of the distribution is the mean.

**Note:** “Districts” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. “SAHE Grantees” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

The average composite value for teachers in district activities is 1.3, indicating some change in teaching practice, while the average value for teachers in SAHE-grantee activities is 1.4. Although this difference of about 0.1 point on the composite scale appears small in numeric terms, it is statistically significant. (The standard deviation among district teachers for our change in teaching composite is about .8. This means that the difference between teachers in SAHE-grantee activities and teachers in district activities is about .125 standard deviations.) The difference between traditional and reform activities is somewhat greater. The average composite score is 1.4 for teachers in district reform activities and 1.2 for district traditional activities, a difference of 0.2 point. The parallel results for teachers in SAHE-grantee activities are 1.6 and 1.4, also a difference of 0.2 point.

### Summary: Teacher Outcomes

Overall, our results indicate that a substantial portion of teachers in SAHE-grantee activities, and a smaller but still notable proportion of teachers in district activities, report that participation enhanced their knowledge and skills. For example, 68 percent of teachers participating in SAHE-grantee activities reported enhanced knowledge in mathematics and science, compared with 48 percent of teachers in district activities.

A large proportion of teachers in SAHE-grantee activities and a somewhat smaller proportion in district activities also report changes in teaching practice, as a result of participation. For example,

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66 percent of teachers in SAHE-grantee activities and 55 percent of teachers in district activities report making changes in the cognitive challenge of classroom activities as a result of participation.

Our data indicate that teachers participating in reform types of activities, such as mentoring, coaching, and study groups, are somewhat more likely than teachers in traditional forms of professional development, such as workshops, to report enhanced knowledge and skills. They are also more likely to report change in teaching practice.

With respect to knowledge and skills, the effect of program component (SAHE grantee versus district) is larger than the effects of activity type (reform versus traditional). But, with respect to change in teaching practice, the effect of program component (SAHE grantee versus district) is smaller than the effect of activity type (reform versus traditional). This may be a consequence of the fact that SAHE-grantee activities are especially likely to focus on subject matter content, and thus they have a strong effect on teachers' reported change in knowledge and skills. Reform activities are especially likely to encourage coherent professional development, including alignment and professional communication among teachers, and these elements may be important supports for change. (This issue is discussed further in the following section.)

Our data can be used to assess Eisenhower professional development with respect to the Department of Education's performance indicator 1.1 (see box), pertaining to change in teacher knowledge and skills. The indicator sets a standard of 50 percent of teachers reporting enhanced knowledge and skills as a result of participation. Our results indicate that district activities meet this standard for two domains of knowledge and skills (curriculum and instruction), but not the other four (in-depth knowledge in mathematics and science, approaches to assessment, uses of technology, and approaches to student diversity). SAHE-grantee activities meet the standard in four of the six domains (in-depth knowledge, curriculum, instruction, and uses of technology).

One way to assess the magnitude of the reported enhancement of knowledge and skills is to compare the results we obtained with the results for professional development activities that have been identified as exemplary. Data on enhancement of knowledge and skills somewhat parallel to ours are available for teachers participating in 34 exemplary summer institutes in mathematics and science, supported by the National Science Foundation, the Department of Education, and other agencies (Carey & Frechtling, 1997). A comparison of our data for SAHE-grantee activities with the results obtained for the 34 exemplary activities indicates that teachers participating in SAHE-grantee activities report enhancement of knowledge and skills in mathematics and science content roughly comparable to the results for the 34 exemplary activities.<sup>26</sup> Teachers

**Indicator 1.1 Teachers' Skills and Classroom Instruction.**

By 1998, over 50 percent of a sample of teachers will show evidence that participation in Eisenhower assisted professional development has resulted in an improvement in their knowledge and skills, and by 2000, over 60 percent will show such evidence. By 1999, over 50 percent of a sample of teachers in selected sites will show evidence that participation in Eisenhower-assisted professional development has resulted in improved classroom instruction.

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<sup>26</sup> Carey and Frechtling (1997) indicate that 44 percent of participants in outstanding teacher development programs reported that the programs enhanced their knowledge and understanding of science content to "a great extent" (value of 5 on their 5-point scale). If we isolate the percentage of participants in SAHE-grantee activities who reported that the activity enhanced their mathematics or science knowledge "to a great extent" (value of 5 on the 5-point scale), the percentage is 41 percent. The comparable percent for district activities is 24 percent.

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participating in district Eisenhower activities show somewhat weaker results than do teachers in the 34 exemplary activities.

## **PARTICIPATION OF TEACHERS FROM HIGH-POVERTY SCHOOLS**

### **Section Findings**

- ♦ *Teacher participants in district Eisenhower-assisted activities are only slightly more likely to be from high-poverty schools than are teachers in the national teaching force as a whole. Teacher participants in SAHE-grantee activities are less likely to be from high-poverty schools than are teachers in the national teaching force.*

The Eisenhower legislation emphasizes that programs and activities should be provided to teachers of diverse populations of students. Several provisions of the law state that funds should be used to provide professional development that benefits students from diverse backgrounds. One of the law's purposes is to incorporate

...effective strategies, techniques, methods, and practices for meeting the educational needs of diverse student populations, including females, minorities, individuals with disabilities, limited English proficient individuals, and economically disadvantaged individuals, in order to ensure that all students have the opportunity to achieve challenging State student performance standards (Section 2002(1)(D)).

In addition, the local plan for professional development is required to describe how local professional development activities will meet the needs of teachers of diverse student populations. For example, applications from LEAs are required to include a description of how their Title II activities "will address the needs of teachers in schools receiving assistance under part A of Title I" (Section 2208(d)(1)(B)).

These provisions are indicative of the fact that teachers in high-poverty, low-achieving schools are often most in need of professional development (Darling-Hammond, 1997b). Teachers in high-poverty schools are often less experienced than teachers in other schools, they frequently have students who are more challenging to teach, and they often face larger class sizes and fewer resources than are common in low-poverty schools (Darling-Hammond, 1997b; U.S. Department of Education, 1999a). In addition, teachers in high-poverty schools often have fewer opportunities to participate in certain kinds of professional development than their counterparts at more middle-class schools (U.S. Department of Education, 1998a).

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To estimate the percent of Eisenhower participants from high-poverty schools, we drew on data on the percent of students eligible for the free lunch in each of the schools in which teachers in our national sample taught at the time of the survey.<sup>27</sup> We classified schools as high-poverty if the percent of students eligible for free lunch were 50 percent or greater.<sup>28</sup> For comparison, we conducted a parallel analysis of the percent of teachers in high-poverty schools for the full national population of teachers.

The results of our analysis for participants in district Eisenhower activities are displayed in Exhibit 3.19. The initial pair of bars on the left of the exhibit indicate that, overall, 23 percent of teachers participating in district Eisenhower activities are from high-poverty schools, as compared to about 21 percent for the full national population of teachers. This difference is statistically significant, indicating that participating teachers are slightly more likely to be from high-poverty schools than are teachers in the nation as a whole ( $p < .10$ ).

In part, this result may reflect the fact that, according to the funding formula for Title II, funds are distributed to districts based in part on the districts' Title I allocations, which are based on the number of school children in poverty. To explore the extent to which the participation of teachers from high-poverty schools is due to the funding formula, we classified the districts in our sample into three strata, by district poverty.<sup>29</sup>

Results on the percent of Eisenhower participants from high-poverty schools are displayed separately for the three district poverty strata in Exhibit 3.19, along with parallel data on the national percent of teachers from high-poverty schools in each of these strata. The data indicate that, in *high-poverty districts*, 45 percent of the nation's teachers as a whole are from high-poverty schools, and 51 percent of Eisenhower participants are from high-poverty schools. This difference, which is statistically significant, suggests that high-poverty districts tend to concentrate their resources on their highest poverty schools. In *medium-poverty districts*, 17 percent of Eisenhower participants are from high-poverty schools, compared with 14 percent of teachers in these districts, which suggests somewhat less targeting of resources within medium-poverty districts. In *low-poverty districts*, two percent of Eisenhower participants are from high-poverty schools, compared with four percent of teachers in these districts.

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<sup>27</sup> We obtained these data from the Common Core of Data. The Common Core requests information on the number of students eligible for free lunch (but not reduced-price lunch) for every public school in the country. Unfortunately, data are entirely missing from some states and for some schools in other states. We used a hot-deck imputation method to impute free-lunch data for these schools, based on information on district expenditures for free lunch, as well as information on school level (elementary, middle, and high school), the number of schools in the district, and the minority composition of the school in relation to the district average. Data on free-lunch participation are not generally available for private schools, and thus we excluded the small number of participating teachers from private schools from this analysis.

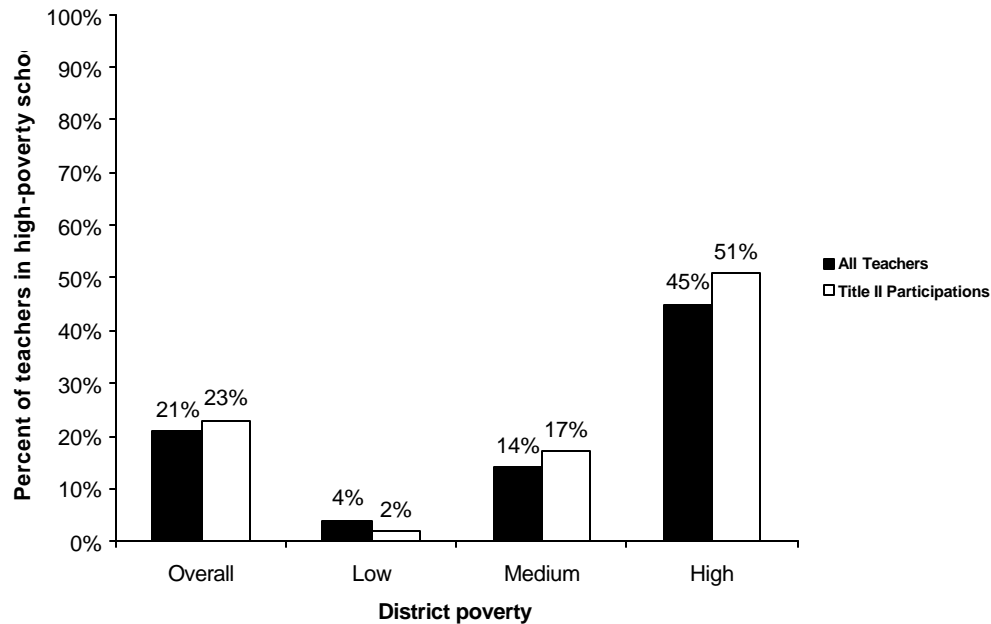
<sup>28</sup> To eliminate the potential impact of teacher non-response on this analysis, we included all teachers in our intended sample, whether or not they responded to the survey.

<sup>29</sup> We classified districts into three strata according to the percent of school-age children in poverty, based on the 1990 Census. We used these strata as one part of our sampling plan for districts. See Appendix A.



### EXHIBIT 3.19

#### Percent of Teacher Participations in District Eisenhower-assisted Activities Compared to All Teachers in the Nation, Overall and by District Poverty (n=1197)



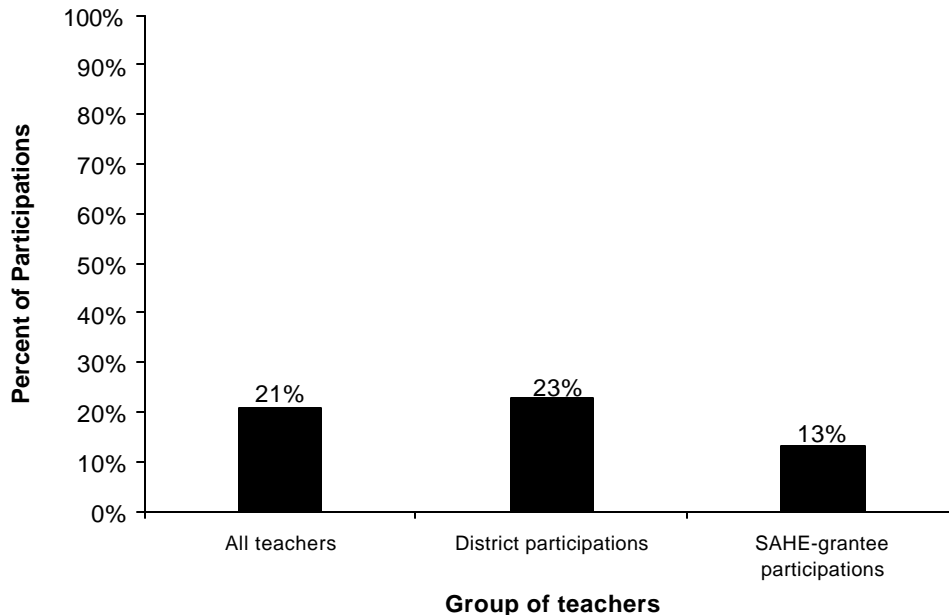
**Source:** Results for all teachers are based on data on the full population of schools from the CCD. Data on Title II Participations are based on the Mail Survey of Teachers Participating in Eisenhower-assisted Telephone Activities, 1998, including both respondents and non-respondents. **How to read this exhibit:** The first bar shows that 21 percent of teachers are in high-poverty schools. The second bar shows that 23 percent of participations in Eisenhower-assisted activities are from high-poverty schools. Each bar and the number on the top of it represent the percent of teachers for each category.

We carried out a parallel analysis of the percent of teachers from high-poverty schools, for teachers participating in SAHE-grantee activities.<sup>30</sup> The results, shown in Exhibit 3.20, indicate that about 13 percent of SAHE-grantee participants are from high-poverty schools, which is significantly lower than the overall percent of teachers in high-poverty schools for the nation. Thus, SAHE grantees appear less successful in targeting their activities on teachers than do districts.

<sup>30</sup> Since IHE/NPO activities are not necessarily tied to particular districts, we could not examine the results by district poverty.

## EXHIBIT 3.20

### Percent of Teacher Participations in District and SAHE Grantee Eisenhower-assisted Activities from High-poverty Schools (District n=1197, SAHE Grantee n=254)



**Source:** Results for all teachers are based on data on the full population of schools from the CCD. Data on Title II Participations are based on the Mail Survey of Teachers Participating in Eisenhower-assisted Telephone Activities, 1998, including both respondents and non-respondents.

**How to read this exhibit:** The first bar shows that 21 percent of teachers are in high-poverty schools. The second bar shows that 23 percent of in-district Eisenhower-assisted activities are from high-poverty schools. The third bar shows that 13 percent of participations in SAHE-grantee activities are from high-poverty schools. Each bar and the number on top of it represent the percent of teachers for each category.

**Note:** “District participations” refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. “SAHE-grantee participations” refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

### Summary: Participation of Teachers from High-poverty Schools

Our results indicate that teachers in district Eisenhower-assisted activities are slightly more likely to be from high-poverty schools than are teachers in the nation as a whole, while teachers in SAHE-grantee activities are somewhat less likely to be from high-poverty schools. Our data for districts indicate that the standard set in the Department of Education’s Performance Indicator pertaining to participation from high-poverty schools has been met for district activities. (See box.) But it has not been met for SAHE-grantee activities.

**Indicator 4.1 High-poverty Schools.** The proportion of teachers participating in Eisenhower-assisted activities who teach in high-poverty schools will exceed the proportion of the national teacher pool who teach in high-poverty schools.

To some extent, the results for districts are encouraging: they indicate that the program has been somewhat successful at targeting resources on teachers of disadvantaged children. But the percentage of teachers from high-poverty schools served by the program is only modestly higher than the rate for the nation, indicating that the more progress might be made in this area. We give more

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attention to this issue in Chapter 4, and to targeting of participants in SAHE-grantee projects in Chapter 6.

## WHAT FEATURES OF PROFESSIONAL DEVELOPMENT MAKE A DIFFERENCE FOR TEACHER OUTCOMES?

In the previous sections of the chapter, we have described the quality of Eisenhower-assisted activities—as defined by their structural and core features—and teacher outcomes for Eisenhower-assisted activities, as reported by teachers in our national sample. Now, we draw on these data to examine the relationships among these characteristics of professional development activities, in an effort to identify the characteristics of professional development activities that are related to teacher outcomes.

Throughout the chapter, we have characterized professional development activities in terms of structural and core features. We view the three structural features—activity type (reform versus traditional), duration, and collective participation—as elements that set the parameters or context in which a professional development activity takes place. And we view the three core features—content focus, active learning, and coherence—as characteristics of the professional development processes and experiences that take place during an activity. Given this framework, we expect the structural features of professional development to play an important role in determining the substance or core of the professional development experienced by teachers; and we expect the core features of the professional development experienced to contribute to teacher outcomes, including enhanced knowledge and skills and improvements in teaching practice.

To test this view of professional development, we estimated a formal causal model, using data from our national sample of teachers. The model serves two related purposes: it enables us to determine whether the relationships we have hypothesized are supported by the data we have collected, and it also permits us to develop estimates of the strength of these relationships. The model incorporates the following measures of the *structural features* of professional development: activity type (coded reform=1, traditional=0); two aspects of duration—time span (coded 1=less than one day, 6=more than one month) and number of contact hours; and collective participation (coded 0=not collective, 1=somewhat, 2=collective).<sup>31</sup>

The model also incorporates the following measures of the *core features* of the professional development experiences: content focus (coded 0=not at all, 1=minor emphasis, 2=major emphasis); active learning (coded as the number of types of opportunities for active learning, from 0 to 20); and coherence (coded as the number of elements of coherence, from 0 to 9).

Finally, the model includes the following *outcome* measures: enhanced knowledge and skills (coded from 1=not at all to 5=great extent); and change in teaching practice (coded from 0=no change to 3=significant change).

Since it is possible that teachers in different types of schools or teachers with different characteristics may experience different types of professional development, we have included *school*

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<sup>31</sup> See Appendix E for more a more detailed description of the variables.

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*and teacher* characteristics as control variables in our model. The model includes the characteristics of the schools in which the participating teachers teach: the percent of students eligible for free lunch and the percent of minority enrollment. The model also includes five characteristics of the participating teachers: gender, subject of the teacher's professional development experience (mathematics or science); grade level (elementary, middle, or high school); whether the teacher is certified in the teacher's main teaching field; and the teacher's teaching experience, in years.<sup>32</sup> (See Appendix E for more information on our measures of these school and teacher characteristics.)

In addition, since we are interested in understanding the differences between activities supported through the district and SAHE component of the program, we have also included the sponsorship of the activity as a variable in the model (coded 1=SAHE grantee, 0=district).

The results are shown in Exhibit 3.21. (A more detailed presentation of the results appears in Appendix E.) The results shown are expressed as standardized path coefficients, which represent the relative influence of one variable on another. Path coefficients generally have values between -1 and +1, and coefficients with larger absolute values indicate stronger relationships. All paths shown are statistically significant.

To interpret the results, we begin by discussing the variables at the left-hand side (sponsorship and structural features) and proceed to discuss the core features and teacher outcomes. First, the analysis indicates that sponsorship has a substantial effect on both the time span and contact hours spent in professional development: on average, SAHE-grantee activities are spread over a substantially longer period of time and involve more hours of professional development than district activities.<sup>33</sup> Sponsorship also has an influence on active learning and collective participation: SAHE-grantee activities are more likely to provide opportunities for active learning, and less likely to be designed for collective participation than district activities; that is, they are less likely to be designed for teachers in school, department, or grade-level groupings. Finally, sponsorship has a direct influence on content focus: controlling for time span and contact hours, SAHE-grantee activities tend to give more emphasis to content than do district activities.

Activity type is somewhat less influential than sponsorship, but, like sponsorship, it has an important influence on duration: reform activities tend to span longer periods and to involve greater numbers of contact hours than traditional activities.

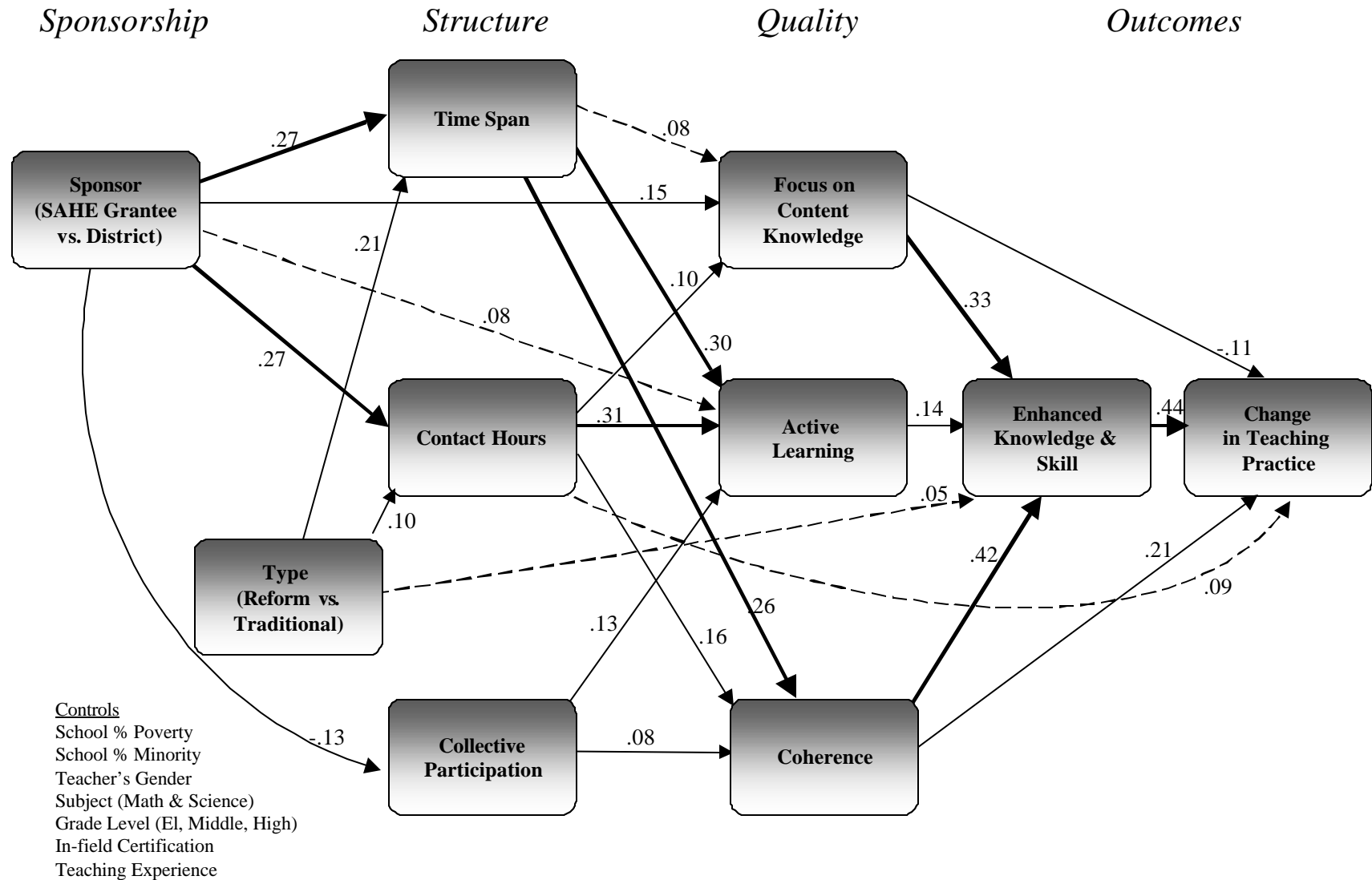
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<sup>32</sup> With few exceptions, we found few systematic differences in Eisenhower professional development experiences for teachers in different types of schools or with different characteristics. One teacher characteristic that has a consistent effect is grade level taught. Teachers in secondary schools tend to report participating in activities with less positive quality (for example, fewer opportunities for active learning and less change in teaching practice). See Appendix E.

<sup>33</sup> These and all other results described control for the school and teacher characteristics discussed in the text.

# EXHIBIT 3.21

## THE RELATIONSHIP OF FEATURES OF PROFESSIONAL DEVELOPMENT TO TEACHER OUTCOMES



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As we expected, our two measures of duration—time span and amount of time—exert a substantial influence on the core features of professional development experiences.<sup>34</sup> Time span and amount of time have a substantial positive influence on opportunities for active learning and coherence. Longer activities tend to include substantially more opportunities for active learning (such as the opportunity to plan for classroom implementation, observe and be observed teaching, review students’ work, and give presentations and demonstrations); and they also tend to incorporate more aspects of coherence (including connections to a teacher’s goals and experiences, alignment with standards, and professional communication with other teachers). Time span and amount of time also have a moderately positive influence on the emphasis given to content knowledge: activities that span a longer period and last more hours are more likely to focus on mathematics and science content.

The fact that both time span and contact hours have independent effects on our measures of core features suggests that both dimensions of duration are important. Professional development is likely to be of higher quality if it is both sustained over time and involves a substantial number of hours.

As we anticipated, all three of our measures of the core features of activities have a positive influence on enhanced knowledge and skill, as reported by the teachers in our sample. Both content focus and coherence have substantial positive effects on enhanced knowledge and skills, indicating that activities that give greater emphasis to content and that are better connected to teachers’ other professional development experiences and other reform efforts are more likely to produce enhanced knowledge and skills.<sup>35</sup> Active learning is also related to enhanced knowledge and skills, but the effect is less strong.

Finally, enhanced knowledge and skills have a substantial positive influence on change in teaching practice: teachers who report enhanced knowledge and skills are likely to report changing their teaching practices as well. In addition, the coherence of professional development activities has an important positive influence on change in teaching practice, over and above the effects of knowledge and skills. This suggests that teachers who experience professional development that is connected to their other professional development experiences, is aligned with standards and assessments, and fosters professional communication, are more likely to change their practice, even among teachers who have gained the same underlying knowledge and skills as a result of their professional development experiences.

These results are very encouraging, for a number of reasons. First, they tend to confirm several of the key assumptions underlying the Title II reauthorizing legislation. For example, our results indicate that sustained and intensive professional development is more likely to be of high quality, as reported by teachers, than is shorter professional development. Our results also indicate

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<sup>34</sup> The model predicting the core features and teacher outcomes includes sponsorship, the structural features, and all control variables.

<sup>35</sup> When enhancements in knowledge and skills is controlled, content focus has a negative association with changes in classroom practice. We suspect that this result is probably spurious, resulting from the large number of independent variables included in the model predicting change in teaching practice. (The model for change in teaching practice includes all of the structural and core features of professional development, as well as all control variables.) We estimated a model predicting change in teaching practice but omitting knowledge and skills as an intervening variable, and, in that model, content focus has a positive effect.

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that professional development that focuses on academic subject matter, gives teachers opportunities for “hands-on” work, and is integrated into the daily life of the school, is more likely to produce enhanced knowledge and skills.

Second, the results provide insight into the reasons why teachers in SAHE-grantee activities tend to report more positive outcomes than teachers in district activities. In particular, the model indicates that the difference between SAHE-grantee and district activities can be accounted for almost entirely by the fact that SAHE-grantee activities are of substantially longer duration than district activities (both in terms of time span and contact hours), and they give more emphasis to subject matter content. Our results indicate that, when these structural and core features are controlled, sponsorship (SAHE grantee versus district) does not have a direct effect on teacher outcomes.

In addition, our results indicate that the effects of activity type are also largely indirect, operating through duration. Reform activities tend to be of longer duration than traditional activities, and this accounts for nearly all of the positive effects of type.<sup>36</sup>

Finally, our results call attention to the importance of the coherence of professional development activities. Activities that are linked to teachers’ other experiences, aligned with other reform efforts, and encouraging of professional communication among teachers appear to support change in teaching practice, even after the effects of enhanced knowledge and skills are included in the model.

## SUMMARY AND CONCLUSIONS

In this chapter, we have drawn on our nation sample of teachers who participated in Eisenhower-assisted activities to undertake a number of analyses. First, we have drawn on the data to describe the characteristics of these activities and to assess the extent to which these characteristics reflect the intent of the authorizing legislation and the descriptions of best practice in the literature. Second, we have drawn on the data to examine the degree to which Eisenhower-assisted activities have resulted in enhanced knowledge and skills and improved teaching practices, as reported by the teachers in our sample. We have used our data to identify the relationship between the characteristics of Eisenhower-assisted activities and outcomes for teachers.

Our results indicate that, on the average, supported activities share some but not all of the characteristics of high-quality professional development identified in the literature. Activities supported through the SAHE component of the program tend, on average, to be of substantial duration, and many SAHE-grantee activities focus on mathematics and science content and provide appropriate active learning opportunities for teachers. Some activities supported by the district component of the program also share these elements of high quality, but, on average, district activities tend to be somewhat less consistent with the dimensions of high quality identified in the literature.

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<sup>36</sup> Our results show a modest direct effect of activity type on enhanced knowledge and skills, indicating that reform activities have slightly more positive outcomes when all of the design features and quality characteristics in our model are included.

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Many teachers who participate in Eisenhower-assisted activities report enhanced knowledge and skill as a result of participation, as well as changes in teaching practice. This is especially true for SAHE-grantee activities; somewhat fewer teachers in the district component of the program report gains in knowledge and skills or changes in teaching practice.

Our analysis of the relationship between the characteristics of Eisenhower-assisted activities and teacher outcomes indicates that several structural and core features play a strong role in influencing teacher outcomes. In particular, the duration of activities has a strong influence on the degree to which the activities are able to provide high-quality experiences for teachers. Both the time span over which activities are spread and the number of contact hours of professional development provided have a substantial independent influence on the core features of the professional development provided. In addition, the organizational form or type of the activity also has an influence on the core features of the experience provided. On average, reform types of activities, such as mentoring and study groups, tend to provide higher quality experiences than traditional activities, such as workshops, although there is a substantial range of experiences within each type.

Our data indicate that three core features of professional development have an important influence on the extent to which participation enhances teachers' knowledge and skills and leads to improved teaching practices, as reported by teachers in our sample. In particular, positive teacher outcomes are related to the extent to which activities focus on subject matter content, provide active learning opportunities for teachers, and nurture a coherent program of professional development that is connected to other aspects of teachers' work lives.

Finally, the features of professional development we have identified in our model help explain why SAHE-grantee activities have more positive effects, as reported by teachers, than district activities. SAHE-grantee activities tend to have longer time spans and provide more hours of professional development than district activities, and this in turn permits SAHE-grantee activities to give more emphasis to subject matter content, to provide more active learning opportunities, and to strengthen the coherence of teachers' professional development experiences.

To build on this analysis of teachers' report of their experiences in Eisenhower-supported activities, the next chapter turns to an analysis of district coordinators' descriptions of their Eisenhower-supported activities.